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MEDICINE AND SURGERY

Gastroenterological Number

JUNE SEVENTH
1922



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CHICAGO

ORIGINAL COMMUNICATIONS

MALIGNANCIES OF THE COLON. <i>By John F. Erdmann, M. D., and R. F. Carter, M. D., New York</i>	649
ACUTE INTESTINAL OBSTRUCTION. <i>By Albert F. R. Andresen, M. D., F. A. C. P., Brooklyn, N. Y.</i>	653
ACUTE INTUSSUSCEPTION. <i>By T. Turner Thomas, M. D., Philadelphia</i> ..	656
FLUOROSCOPY IN DISEASES OF THE ABDOMINAL ORGANS. <i>By Arthur Lawrence Holland, M. D., New York</i>	659
THE SYMPTOM PAIN IN THE DIAGNOSIS OF APPENDICITIS. <i>By Pellegrino A. D'Acerno, M. D., Weehawken, N. J.</i>	663
THE CAUSE AND PREVENTION OF GASTROJEJUNAL AND JEJUNAL ULCER. <i>By Abraham O. Wilensky, M. D., New York</i>	668
DIETETIC AND TREATMENT REGULATIONS IN GASTRODUODENAL ULCER. <i>By Anthony Bassler, M. D., New York</i>	670
SOME DIFFICULTIES IN THE DIAGNOSIS OF PEPTIC ULCER. <i>By A. Wiese Hammer, M. D., F. A. C. S., Philadelphia</i>	672
ACUTE PERFORATION OF GASTRIC AND DUODENAL ULCER. <i>By Alfred H. Noehren, M. D., F. A. C. S., Buffalo, N. Y.</i>	674
THE PROBLEMS AND THE PROGRESS OF GASTRIC ULCER SURGERY. <i>By Weller Van Hook, A. B., M. D., Chicago</i>	678
THE RECOGNITION AND TREATMENT OF MINOR AILMENTS OF THE DIGESTIVE SYSTEM. <i>By Max Einhorn, M. D., New York</i>	681
A NEW TECHNIC FOR THE PREPARATION OF BACILLUS ACIDOPHILUS MILK AND ITS THERAPEUTIC VALUE. <i>By Andrew A. Eggston, M. D., and N. Philip Norman, M. D., New York</i>	683
RADIOLOGICAL DIAGNOSIS OF PRIMARY CARCINOMA OF THE ASCENDING COLON WITH METASTASIS TO THE JEJUNUM. <i>By I. Glassman, M. D., New York</i>	686

CONTENTS CONTINUED ON PAGE 7.

Dioxogen = (Hydr. Diox. Oakland)

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CHRONIC COLITIS IN NEUROPSYCHIATRIC CASES. By John W. Fisher, M. D., Waukesha, Wis.	688
RÖNTGEN RAY LOCALIZATION OF THE INTESTINAL TUBE. By Jacob Buckstein, M. D., New York	690
A COMPARISON OF SUCCESSIVE ASPIRATES OF THE GASTRIC CONTENTS. By Bruce C. Lockwood, M. D., and Harry J. Jacobson, M. D., Detroit.....	693
STANDARDIZATION OF THE TEST MEAL. By Victor Knapp, M. D., New York	695
F. WIDAL. By Malford W. Theodis, M. D., Paris	699

EDITORIAL ARTICLES

THE PATHOGENESIS AND TREATMENT OF PHLEGMONOUS GASTRITIS.....	700
THE SURGICAL TREATMENT OF ASCENDING STERCORAL STASIS	700
ATTACKING EPIDEMICS AT THEIR SOURCE	701
NEW CONCEPTIONS OF TREATMENT	702
THE CANCER SITUATION	703
PROPER CREDIT	704
NEWS ITEMS	704

BOOK REVIEWS

DISEASES OF THE DIGESTIVE ORGANS. By Charles D. Aaron, Sc. D., M. D.	706
DIE RÖNTGENDIAGNOSTIK DER MAGENKRANKHEITEN. Von Privat-Dozent Dr. M. Faulhaber	706
THE MECHANICS OF THE DIGESTIVE TRACT. By Walter C. Alvarez, M. D.	706

CONTENTS CONTINUED ON PAGE 7.

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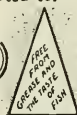
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THE VITAMINES. <i>By H. C. Sherman</i>	706
PATHOLOGIE UND THERAPIE DES HÆMOLYTISCHEN IKTERUS. <i>Von Prof. Dr. M. Mosse</i>	707
MEDICAL AND SURGICAL CLINICS OF NORTH AMERICA.....	707
THE PHYSIOLOGY OF GOUT, RHEUMATISM, AND ARTHRITIS. <i>By Percy Wilde, M. D.</i>	707
A TEXTBOOK OF PHYSIOLOGY FOR MEDICAL STUDENTS AND PHYSICIANS. <i>By William H. Howell, Ph.D., M. D., Sc.D., LL.D.</i>	707
PATHOLOGISCHE PHYSIOLOGIE. <i>Von Dr. H. E. Hering</i>	708
SURGICAL AND MECHANICAL TREATMENT OF PERIPHERAL NERVES. <i>By Byron Stookey, A. M., M. D.</i>	708
DISGUISES OF LOVE. PSYCHOANALYTICAL SKETCHES. <i>By W. Stekel</i>	708
HYGIENE OF WOMEN AND CHILDREN. <i>By Janet E. Lane-Clayton, M. D.</i> ...	708
INTRUSION. <i>By Beatrice Kean Seymour</i>	708

PRACTICAL THERAPEUTICS

NEW AND DIRECT METHOD OF TREATING CATARRHAL JAUNDICE. <i>By Arthur H. Hopkins, M. D., Philadelphia</i>	710
APPENDIX AND DISEASES OF ADNEXA	711

PROCEEDINGS OF SOCIETIES

MEDICAL SOCIETY OF THE STATE OF NEW YORK.....	716
---	-----

MISCELLANY

CHRONIC BACILLARY DYSENTERY AND COLITIS GRAVIS.....	720
MIXED BACTERIOPHAGES	720



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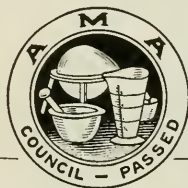
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and the Function of the Frontal Lobes, by Professor Leonardo Bianchi, Senator of the Kingdom of Italy, Professor of Psychiatry and Neuropathology in the Royal University of Naples, Ex-Minister of Public Instruction. Authorized Translation from the Italian by James H. MacDonald, M.B., Ch.B., F.R.F.P.S., (Glasgow). Lecturer in Psychological Medicine, Glasgow University; Medical Superintendent, Gocuan District Asylum. Large Octavo, 348 pages, illustrated, \$5.50 net.

This work is the outcome of a series of experimental investigations covering a period of thirty-three years into the problems of the function of all that cerebral area which is situated in front of the presylvian fissure. The present volume is devoted to general doctrines, to the experimental aspects of the subject, and to an initial phase of anatomical psychology, postponing the analysis of clinical cases to another occasion. Professor Bianchi sets forth the outstanding points in the physiology of the cerebral mantle, reviews the doctrines of the localisations, and defines the functional relations between the cerebral mantle, the zone of language, and the frontal lobes. Many will agree with his statement that mental development always involves development of the brain. He has now adduced cogent evidence in support of the further contention that higher mental development is correlated with the activity of the frontal brain.

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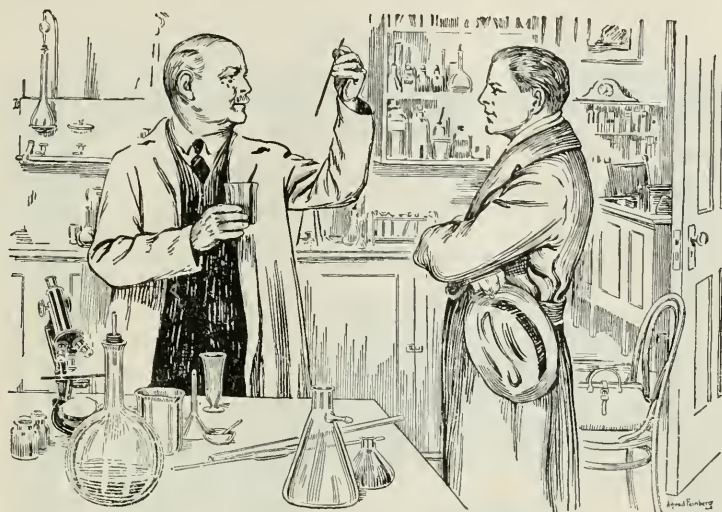
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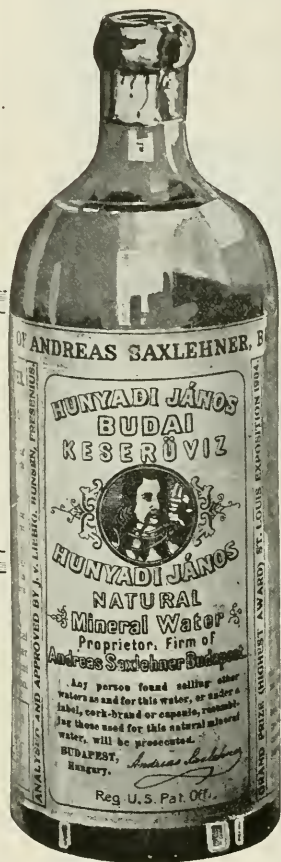
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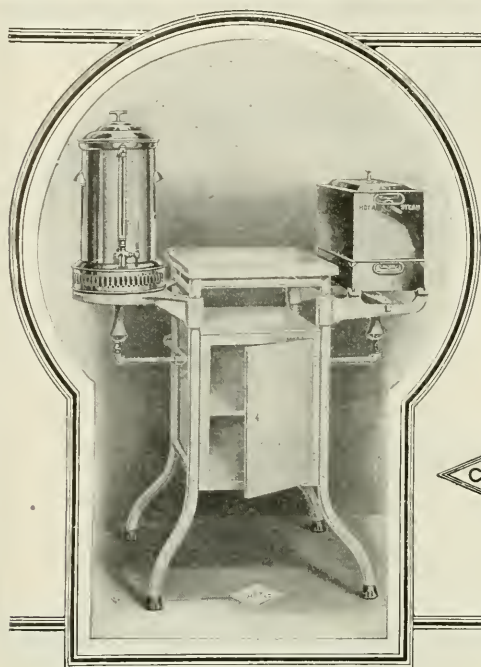
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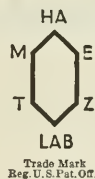
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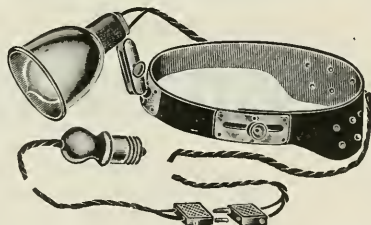
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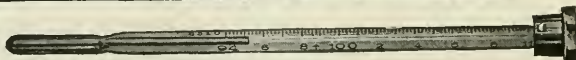
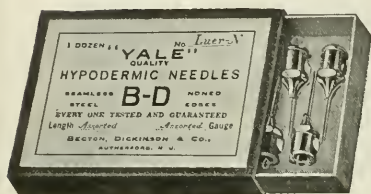
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Philadelphia Medical Journal ^{and} Medical News

A Semimonthly Review of Medicine and Surgery, Established 1843.

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NEW YORK, WEDNESDAY, JUNE 7, 1922.

WHOLE No. 2234

Malignancies of the Colon*

By JOHN F. ERDMANN, M.D.,

New York,

Director of Surgery, New York Post-Graduate Medical School and Hospital,

and R. F. CARTER, M.D.,

New York,

Instructor in Surgery, New York Post-Graduate Medical School and Hospital.

Feeling that a consideration of our work in this field at the Post-Graduate Hospital and Medical School added to the work done in several outside hospitals would be of more practical benefit than a theoretical paper, we present a study of 129 cases which came under our operative care in a service covering the past six years. Of this number, fifteen were inoperable from the viewpoint of metastasis to other organs, and nine were inoperable from the viewpoint of extensive regional metastasis. The remaining 105 patients were operated upon according to some one of the various types of palliative or radical methods, which will be considered later.

Malignancies of the colon have been observed over fifty per cent. more frequently during these six years than malignancies of the stomach. During this period carcinoma of the stomach (in the Post-Graduate Hospital) was seen in seventy patients, while carcinoma of the colon was found in ninety-six patients in the same service. These figures bear no positive relationship to the frequency or excess of the colonic cases but present a fair indication of colonic malignancies. The sites of frequent occurrence are considered under the regional classification in the order of frequency found in the cases considered in this article:

CLASSIFICATION OF SITES OF FREQUENT OCCURRENCE.

1. In the inferior division of the inferior mesenteric divisions, that portion of the gut from the anus to the sigmoid, including the so-called sigmoido-rectal junction—a series of fifty out of the total of one hundred and twenty-nine.

2. In the superior division of the inferior mesenteric, or the sigmoid zone proper, a series of thirty-

seven out of the total of one hundred and twenty-nine.

3. The ileocolic region or the cecum and the terminal ileum, presents a record of eighteen out of the one hundred and twenty-nine.

4. The midcolic region—considering this area to include the upper half of the ascending colon, the hepatic flexure and the proximal half of the transverse colon, presents fifteen out of one hundred and twenty-nine.

5. The distal colic region, including the distal half of the transverse colon and the descending colon, sums up nine patients.

The regional frequencies present food for thought as to the etiological factors so frequently given as stasis irritation. The anal types—those involving the lowest segment of the rectum and the sphincter—were seen quite frequently in the first list. They have been and are still the source of great speculation as to causation beyond that of the mucocutaneous margin theories.

AGE AND SEX OF PATIENTS.

A series of eighty-six patients under observation at the Post-Graduate Hospital were rather equally divided between the sexes, forty-six being males and forty females. But a marked difference in sex preponderance occurs in the female in cancer of the lowest segment. In the sigmoid, there were ten more males than females, while in the rectosigmoid and rectoanal there were ten more females than males. The average age of patients operated upon was forty-nine and one fifth years, the youngest being a female twenty-two years of age and the oldest a female of eighty-nine.

RAPIDITY OF GROWTH.

The rapidity of growth in these patients is influenced as in cancer in other parts of the body, i. e.,

*Read before the Northwestern Ohio District Medical Association, Toledo, October 7, 1921; First District Branch of the New York State Medical Society; New York Academy of Medicine, Surgical Section, December 2, 1921; Lackawanna County Medical Society, Scranton, Pa., December 6, 1921.

by the age of the patient and the type of the cell. The more youthful the patient, the more rapid the growth. The lapse of time between the initial cell change into carcinoma and the date of operation cannot be estimated, as all calculations must be based upon and reckoned from the appearance of the first symptom, either subjective or objective; and unfortunately often the first symptom is objective—such as evidence of blood or mucus in the stool.

MULTIPLE GROWTHS.

Multiple growths in the colon have not been encountered in this series, although I have seen them in other patients considered in an earlier contribution. A rather unusual instance occurred in this series. One of the patients had had a typical Friedreich's operation done by me for a carcinoma of the appendix, with cecal contiguity and continuity growth, three years ago, and during the past eight months suffered a complete obstruction, due to a growth in the sigmoid. It may well be speculated that this patient had the sigmoid growth at the time of his first operation, or that he had a metastasis (unusual) in the sigmoid from the appendix growth. It was true that he had been submitted to an exploratory appendix operation one year before I saw him, and that his diseased appendix for some unknown reason was not removed.

SYMPTOMATOLOGY.

From the viewpoint of regional classification the symptoms should vary somewhat, but in the main they are prone to slight variation. It is a well observed fact that in growths involving the cecum and the iliocecal region obstruction is a rarity, due to the liquid state of the contents of the small intestine. No acute ileus was observed in any of our patients suffering from a growth in this zone. It is a well known fact that growths of the cecal zone are early associated with marked anemia. It is also observable that tumors of the cecum are palpable as a rule late in the process of the disease and that the x ray is not conclusive as early as in growths in the distal half of the colon.

These patients complain of a feeling of distress, soreness and pressure at this site. In fact, this is so to such a degree that quite frequently an appendicitis of the recurring variety is not only suspected, but the patients have been operated upon for such a disease, the true state of affairs in five of the patients coming to me having been overlooked by the original operators.

Colic in this area is evidenced only when the growth involves the ileocecal valve area to such a degree as to become occlusive or when the growth occupies the distal portion of the caput to such a degree as to become obstructive. As the disease progresses in the distal portion of the colon, cramps or colics become more and more evident. This is essentially due not to the invasion of the lumen of the gut so much as to the difference in the fecal consistency. The more solid the content the more prone to plugging is the lumen—the more liquid the content, the smaller the lumen may be without producing a colic or obstruction.

Toxemias are seen more often in the obstruction of the distal half, due to the proximal deflection of

the fecal current, the growth of the intestinal bacteria and their absorption, due to the obstructive stases. Borborygmus is a frequent evidence, especially when obstruction becomes evident.

I have been laying a great deal of stress on the succussion sound in the cecal zone in various types of obstruction in the colon. This sound is made by the liquid contents of the cecum distending the caput and the gas that of a necessity is forced into this portion of the intestinal tract. This succussion or splashing sound indicates an early operation.

PAIN AS A SYMPTOM.

Occasionally there are sciatic, lumbar and perineal pains due to nerve involvements by the descending colon, sigmoid and rectosigmoidal growths, in addition to the general signs and symptoms. Tenesmus is one of the early symptoms to which the patient's attention is called in the lower distal or sigmoid and rectal involvements. Pain in the back, unfinished sense after defecation, blood or mucus, or both, the loss of ambition, loss of weight and the sallow cachectic countenance, are distinct symptoms. In the rectoanal region with or without infiltration or ulcer we frequently have complete sphincter failure. The occurrence of perforation is not to be underrated. When there is a sharp pain in the lower left quadrant, without emaciation or a fairly long history of tenesmus or bloody or mucous stool, the inference is one tending to a perforating diverticulitis, rather than a perforated malignancy. There were three patients in the series of one hundred and twenty-nine in whom perforated malignancies were found. Each of these had a sigmoid growth.

METHODS OF TREATMENT.

Treatment of these growths today resolves itself into the radical surgical procedure in the proximal three fourths of the colon; and the question of radical operation versus radium with or without excision comes up. These methods I shall discuss later.

PREOPERATIVE TREATMENT.

As a preliminary to operation in this class of patients when possible preoperative treatment of thorough intestinal cleansing should be instituted. This consists of intestinal drainage when the growth is not obstructive, or establishing an artificial anus in some portion of the intestine proximal to the growth. This site is a matter of choice to the operator, but for years my selection has been the cecum in preference to the other segments of the colon, because in all growths distal to the cecum, this position of the artificial anus is remote from the field of the final operation and does not interfere by newly formed adhesions nor by soiling; and, finally, it is easy to close after its function has been terminated. The cleansing of the distal bowel through a cecostomy is readily performed by irrigations after the cecostomy is old enough—two to four days—to prevent leakage into the peritoneal cavity. It is gratifying to observe with what facility the rectal tube can be introduced into the colon through the cecostomy wound during the period of irrigation. A reverse peristalsis takes place readily during this period. During the time of the functioning artificial anus and before the radical operation is performed, care-

ful attention must be given to the renal functioning and nutrition.

RADICAL TREATMENT.

Under the heading of radical procedure one must consider the formation of a permanent artificial anus and the removal of the growth, with repair of the divided ends of the gut. Artificial anus as a temporary expedient has already been discussed, but as a permanent objective several important pathological features must be considered. A permanent artificial anus is to be made only in those patients in whom we find the growth so firmly fixed to surrounding structures that removal would end disastrously, or in patients in whom the contiguous and remote metastases are so extensive as to predicate an early demise with or without operative procedure. In this latter type with remote metastases, as in the liver, I have been doing the radical resection with anastomosis because a permanent artificial anus does not cause the metastases to subside, and because patients with an artificial anus in this variety of pathology, living for a period of from a few months to the best part of two to three years with all the disagreeable associations of an artificial anus, could have had all the discomforts allayed or abolished by an additional risk of a small percentage. I have been very pleased with my results in this type of operation, during the past five or six years.

In the permanent artificial anus patients two methods of procedure as to the growth are to be followed. In the first instance the growth is allowed to remain, while in the second the growth is removed with all the surrounding tissue. The growth is left in those cases in which we find the infiltration extending beyond the possibility of total removal. Therefore, rather than to excite a mushroom activity, the distal segment, after the proper preparation, is dropped into the abdomen and the proximal end is sewed into the abdominal wall; or, as in the lower sigmoid growths, one may leave the doublebarrelled anus so that radium may be applied directly from above and below through the upper and lower stomas of the bowel. In the event that the growth is removable (this applies of course to the lowest segment), the lower portion is liberated from the sacral groove. Then a perineal approach is made to liberate this portion, the whole segment with the growth being delivered through the perineal incision.

In the event of a nonremovable growth in por-

tions of the colon proximal to the sigmoidorectal zone, short circuiting by means of a colonic or ileal byway is in order. This prevents an early total obstruction or a series of periods of partial obstruction.

METHODS OF ANASTOMOSIS.

As to the question of the method of anastomosis, end to end, side to side, or end to side, by suture or mechanical appliance, one must judge his own capacity for the type he will select. The advance in ability to suture without leakage in the great majority of instances, the ability to do fairly rapid work, and the improved qualities of catgut now upon the market, place the Murphy button in the discard.

I have been doing the majority of my anastomoses during the past few years by the end to end method, doing a plastic on the smaller calibre end to meet with the larger end, except in those instances where

the gut is friable from edema. In these a side to side is as a rule successful. Nor do I fear the hypothetical pocketing in doing a side to side anastomosis, because I always make the opening to extend to within one half inch of the inverted ends. I have had no more leakages in my end to end anastomoses than in the side to side, or end to side. Of course there are occasions where one feels that a few minutes saved by doing a side to side will be advantageous. More and more frequently I am doing resections with direct anastomosis in those patients having sigmoid rectal junction growths, thereby preserving the sphincteric functions, while formerly, owing to my difficulty with this type, I was accustomed to

resect and transplant either anteriorly or posteriorly.

The operation of Mikulicz is quite amenable to the growths from the cecum to the rectosigmoid junction. It has been performed by me, however, but ten times in the entire series. While it does seem by statistics to be a safer operation than an immediate end to end or side, etc., I question it from my personal experience, and object to the operation as being one of three to four times the duration of the suture method. Our actual periods are Mikulicz average time in hospital ten weeks, while that of suture anastomosis was four weeks.

In regard to the implantation of the bowel in the perineum or high coccygeal or sacral zone, I find less and less objection to this procedure from my personal viewpoint. As a result of observation in quite a number of such operative cases, I have been forcibly struck with the control, often better than before the operation, and also by the ease with

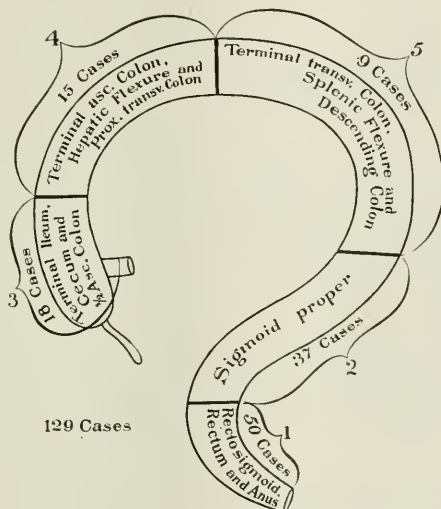


FIG. 1.—Diagram showing regional classification of the sites of colon malignancies in the 129 cases which came under Dr. Erdmann's care in the Post-Graduate Hospital.

which these victims preserve cleanliness. Also there is to the patient himself or herself a great deal less of disgust.

It is customary to have an artificial anus established for seven to fifteen days before doing the radical operation. This procedure is the cause of the loss of the toxemia existing at the time the patients first come under observation and permits of cleansing the bowel to the site of the growth, thereby facilitating the resection and preventing sepsis to a great degree. It also brings about the subsidence of the edema often seen in the proximal portions, and the subsidence of the marked distention—thereby bringing about a more normal diameter of the proximal end for anastomosis with the distal end. Finally, it is a safety vent during the repair of the suture line of anastomosis, by preventing distention with gas and feces, and by taking the weight of the column of feces from the site of anastomosis again prevents leakage to a great degree.

A very able device for anastomosis by the end to end method is the Balfour tube, with invagination of the anastomosis ring. This application acts as an artificial anus in addition to being an invaginator for the ring of anastomosis.

I am not strongly inclined to believe that a complete circle of peritoneum is necessary to prompt union, though admitting its usefulness in promoting repair, but believe that in anastomosing—say the sigmoidorectal zone or sigmoid, that the first essentials are the preservation of the muscular and mucous membrane circulation, the exclusion of all fat lobules, and the accurate approximation of the muscular and mucous coats.

Admitted that anastomosis in these zones is particularly prone to fecal fistula formation, then the most important step is the instituting of proper and competent drainage for a few days. In the anastomosis proximal to the sigmoidorectal zone, I prefer no drain except in the skin wound.

END RESULTS.

1. Extension of life with no foul discomforts, in those patients with existing metastasis in the liver at the time of operation, from eight to twenty-four months or more.

2. In those in whom no appreciable metastasis at remote zones are found, extension of life from months to years. In this series we have traced the greater number of patients and find that there are several of each variety living from one to six years.

The method of Mikulicz was done ten times, end to end anastomosis forty-five times and side to side anastomosis twelve times. The mortality during the past three years has been in marked contrast to that of the first three years—about five per cent. in the former as compared to fifteen to eighteen in the latter. A great deal of this lowering of the mortality is due I feel to the preliminary drainage by means of an artificial opening, and the care observed in placing this opening remote from the field of expected removal. This latter prevents undue adhesion work and soiling of the area by handling of an artificial anus when made in or close to the segment of gut to be excised. A goodly portion of the high mortality has also been due to the des-

perate condition in which some of the patients came to us as several died following the performance of an artificial anus even under local or gas anesthesia. This was due to the toxemia from obstruction absorption.

RADIUM AND X RAY TREATMENT.

I do not feel entitled to discuss this treatment, but have some very definite views as to their general inefficiency as a cure. The question of preoperative "sickening" the cell growth in patients when the growth can be reached is one of weight, well worth considering, although so far I cannot speak with the same fervor as do some of my confrères. Radium has its place at present in the treatment of growths in the rectum, but has again been rather disappointing to me in several instances of supposed cures, which relighted in from six to nine months with redoubled vigor, rapidly placing the patients beyond operative relief, while in the majority of patients its service has not only been negligible but, I am satisfied, deleterious.

AIDS IN DIAGNOSIS.

Aids in diagnosis that are of inestimable value are the proctoscope and the x ray. No patient who has pain in the lower back, perineal or sciatic distribution, who complains of distressing flatulence, tenesmus, or blood and mucus in the stool, should be allowed to leave the physician's observation before proctoscopic examination is made. No patient with abdominal colics, a sense of distress at any of the colonic flexures or throughout its course, nor in the event of a slow losing of weight, with or without evidence in the feces, should be dismissed from observation until a careful series of x ray plates is taken. These should be taken both from a barium or bismuth intake by mouth and by enema. When one suspects a malignancy or other variety of obstruction impending, it is advisable to take the x ray first by means of enema. On two occasions recently we have seen an acute obstruction instituted by the intake by mouth, due to the mass forming, rocklike character of the barium, causing a plug at the contracted lumen, necessitating thereby an emergency operation.

There are times when the greatly distended bowel will produce spasms of the appendix (appendicular colic). As a result of these misleading symptoms, appendectomies had been done in five instances in patients entering my service, which were followed in a few weeks to a number of weeks by a correct diagnosis and operative procedure.

60 WEST FIFTY-SECOND STREET.

Occlusion of Intestines.—Davis and Poynter (*Surgery, Gynecology and Obstetrics*, January, 1922) state that congenital occlusion may occur at any point in the intestinal canal. In fifteen per cent. of this series it is multiple. The condition is relatively rare, it occurs once in about twenty thousand infants. There is no one cause for all of the cases. The various etiological factors may be summarized under the following heads: developmental anomalies, developmental accidents and fetal diseases. Prognosis is bad. Treatment should be an entero-anastomosis performed as early as possible.

Acute Intestinal Obstruction

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The wonderful strides made in medicine and surgery in the past two decades have resulted in a marked reduction of mortality in many conditions formerly considered invariably fatal. Nevertheless the hospital mortality in acute intestinal obstruction, even in the best hospitals in the world, has remained practically at a standstill. Except in a few series of cases, reported by surgeons who had seen their patients from the onset of symptoms and had operated upon them promptly with wonderfully good results, the mortality reported by most surgeons is over forty per cent. The mortality in obstruction from strangulated hernia, where the cause is more obvious, and which is not usually included in statistics of acute intestinal obstruction, is much lower, averaging today about twenty-five per cent. in hospital practice. Statistics from many different sources agree that the operative mortality in acute obstruction is comparatively low where operation is performed soon after the onset of symptoms, and increases rapidly as operation is delayed from day to day. For example, McKenty (10), in forty-three cases, with an average mortality of forty-four per cent., had an operative mortality of only eleven per cent. when the operation was performed in the first twenty-four hours after the onset of symptoms. In the twenty-four to forty-eight hour period it was twenty-two and two tenths per cent., in the forty-eight to seventy-two hour period fifty per cent., and after seventy-two hours, sixty-nine and two tenths per cent. Richardson (12), in a study of 118 cases of operation by twenty-three surgeons in the Massachusetts General Hospital, found a mortality of forty-one and five tenths per cent. in the series, thirty-two and five tenths per cent. in those patients operated upon in the first forty-eight hours after the onset of symptoms, and forty-eight and one tenth in those patients operated upon after forty-eight hours. The patients who recovered had had symptoms for an average of two and six tenths days before operation, those dying, for four and two tenths days.

Delay in seeking operative relief is therefore plainly the cause of the persistently high mortality. Moynihan has stated that anything over ten per cent. is the mortality of delay. This delay in operation is obviously caused by 1, the fact that patients are very apt to spend the first twenty-four or even forty-eight hours in selfmedication, thinking that their symptoms will be quickly relieved by purgation, enemas, hot water bags, etc.; 2, the inability on the part of the average medical man to make a sufficiently early diagnosis to give the patient the benefit of the low mortality attendant upon early operation. The first reason is one difficult to cope with, unless an educational campaign is carried out among the laity, perhaps in the same way that information regarding tuberculosis and cancer has been disseminated. The second reason may be due to several factors, namely, 1, to the relative infrequency of acute intestinal obstruction, so that the average practitioner sees but a few cases in years

of busy practice; 2, to carelessness or inattention on the part of the physician in making light of the early symptoms of acute obstruction, and treating the case as one of constipation or of so-called ptomaine poisoning; 3, to the fact that even the careful, conscientious practitioner, when confronted with a case showing undoubted early obstructive symptoms, does not feel justified in advising surgical consultation, as he has been taught to feel that the cardinal symptoms of obstruction, as emphasized in all textbooks and lectures, are fecal vomiting, visible peristalsis, rapid pulse, Hippocratic facies, and collapse. Any symptoms short of these are held to be insufficient for a diagnosis, and yet it is a fact that cases presenting these symptoms are usually beyond hope of cure by any procedure known to science. The remedy lies in a free and frequent discussion of this subject in medical meetings and in medical publications, and in the correction of the misleading way in which the textbooks confuse early with late symptoms.

Cases of acute intestinal obstruction may be classified from the clinical viewpoint under two groups, namely: 1. The cases of acute obstruction following a more or less long continued period of abdominal or digestive symptoms, such as, a, cases of obstruction due to deformities, bands or adhesions, congenital, postoperative or tuberculous; b, acute obstruction following a gradual narrowing of the lumen of the bowel from pressure from without or protrusion or cicatrix from within, due to ulceration, diverticulosis, or new growth of the bowel; c, obstruction following a long continued gall-bladder irritation, with the passage of a stone and finally intestinal impaction of the stone; d, obstruction from impaction of any other foreign body in the bowel lumen; e, obstruction from fecal impaction following a long continued period of constipation; f, paralysis of the bowel following operation or attendant upon an acute local or general peritonitis or acute pancreatitis. 2. The cases in which the acute obstructive symptoms come on suddenly, without previous symptoms, as in cases of volvulus, intussusception, internal hernia (as, for instance, through a Meckel's diverticulum), or mesenteric thrombosis.

In all types of case the essential pathological condition is the same—occlusion of the lumen of the intestine is the necessary condition. Interference with the circulation of the gut (strangulation) may be either a cause or an effect of the obstruction, and may result in gangrene, perforation, or peritonitis. The development of strangulation nearly doubles the mortality rate in acute obstruction, due not only to the peritonitis which supervenes, but to the serious operation of resection which is necessary where gangrene has occurred.

The cause of the poisoning and subsequent death resulting from acute intestinal obstruction, has not yet been satisfactorily explained. That the mere arrest of the onward passage of intestinal contents

is not the essential cause has been shown by many investigators by the method of producing an isolated loop of intestine by tying off a section of gut above and below, and then reestablishing intestinal continuity around this loop by intestinal anastomosis. The symptoms produced by this procedure are the same as those following complete obstruction at the same level, leading to the conclusion that the symptoms are due to the absorption of toxic substances produced in the obstructed area. Dragstedt (6, 8, 9) and others have shown that these toxic substances are formed even if all secretions and food are carefully removed from the isolated loop before it is closed. The secretions removed before closure, or, in fact, the fresh secretions from any part of the intestinal tract, are not toxic, even when injected intravenously into animals. On standing, however, and thus permitting of bacterial growth in them, the intestinal contents later become markedly toxic. Davis and Stone also have shown that if isolated loops are allowed to drain, even into the peritoneal cavity, no untoward symptoms develop. Dragstedt and his coworkers found that if these loops were washed with sterile water and ether before closure, half of their dogs survived the operation, whereas without the washing all invariably died with toxic symptoms. That this was not entirely due to antiseptic action was proved by the fact that washing with stronger antiseptics than the ether and water mixture did not produce the same good results, and also by the fact that contents subsequently removed from the loop of recovered animals contained many bacteria and were fatal to animals into which they were injected. Single sterilization of a closed loop disclosed the presence of large numbers of bacteria within twenty-four hours. However, in a closed loop kept nearly sterile by constant injections of antiseptics there were no toxic symptoms even when the tissues of the loop went on to complete autolysis due to occlusion of the blood supply. That the astringent action of the ether was a factor in the recovery was shown by the fact that animals whose loops were washed with alum and tannic acid solutions before closure recovered in a small percentage of cases. It was found that dogs dying from a closed loop usually did so in from two to five days, with toxic symptoms developing in the last twenty-four hours to forty-eight hours. These dogs at autopsy invariably showed enormous distention of the loop, with necrotic areas, or perforation with peritonitis. Injection of magnesium sulphate into the loop of a recovered dog resulted in a marked distention of the loop due to osmosis and paresis, with death in three days. All these findings were the same whether the loop was in the colon or in the upper small intestine.

Dragstedt feels that a study of the facts brought out by the experiments briefly described above, together with the fact that animals have survived the removal of the duodenum, warrants the conclusion: 1, that it is impossible to sterilize the intestine by the use of chemical antiseptics, even when applied directly to the mucosa of isolated segments; 2, that, contrary to the opinion of Whipple and others, the mucosa of the alimentary tract does not elaborate an internal secretion necessary to life, nor a secretion disturbed by acute obstruction and producing a pro-

teose accountable for the symptom complex of obstruction; 3, that the substances responsible for the toxemia in acute obstruction are produced by the action of *intestinal bacteria* on proteins or their end-products; 4, that injury to the intestinal mucosa, especially that resulting from disturbance of the blood supply of the intestine, greatly facilitates the absorption of these substances.

Clinically, therefore, we must realize that when toxic symptoms begin to develop in a case of intestinal obstruction it means that the circulation of the gut has begun to be interfered with, and that the hope for successful operation is rapidly becoming more and more remote.

SYMPTOMS.

The symptoms of acute intestinal obstruction, which are almost invariably present from the beginning are: vomiting, constipation, and abdominal pain. The symptoms may begin suddenly without previous warning or may have been preceded by a long train of other symptoms or by more or less recent operation (appendectomy being most frequently the cause of this type).

The vomiting, in the beginning, is of the reflex type, due to pylorospasm, the spasm being an effort on the part of Nature to prevent any more material from reaching and distending the obstructed area. The vomiting is not relieved by lavage and may occur immediately after ingestion of food or drink, especially in high obstruction, or, in low obstruction, may occur later, when some of the food has begun to approach the obstructed area. In from two to four days, when the pylorus begins to play out and pylorospasm ceases as a protective measure, reverse peristalsis in the small intestine, probably all the way down to the ileocecal sphincter, and later actually to the point of obstruction, occurs. The vomiting becomes bile stained and then darker in color until fecal in character. By the time the vomitus becomes fecal the patient's condition is usually such that even most skilful surgery will result in a high mortality.

The constipation, in the beginning, is usually an unobtrusive symptom. The patient may remember having a good stool the day before, although more frequently there is a history of no stool for several days, with various measures taken to relieve the constipation. Enemas which in the beginning may have brought a slight fecal return, may return clear, and no flatus be expelled. If the obstruction is low down, only a very small amount of enema will be held by the rectum at one time (a pint or less), whereas in high obstruction (small intestine) enemas may pass easily into the whole colon and may for a day or two show some fecal return. In intussusception and carcinoma blood may occur in the washings and may be passed spontaneously.

The abdominal pain is usually a prominent symptom, although it may not always be severe. It is usually cramplike in character, occurs all over the abdomen, especially in the midabdomen, and its severer paroxysms are usually accompanied by vomiting (reflex), which, however, does not bring relief. The pain due to violent peristaltic contractions of the intestine above the obstruction, in an effort to force the contents past the point of occlusion, is

aggravated at once by food and cathartics and not relieved by enemas. It is usually worse in the first few days after the obstruction, becoming gradually less severe as the intestinal musculature becomes tired out, although occasional violent spasms may occur even late in the disease. This peristaltic pain, so characteristic of obstruction, is usually succeeded later by the pain of distention or the very intense constricting pain of strangulation, when the patient's chances of recovery have become slim indeed.

The findings on examination are usually very indefinite. Of the signs so beautifully described in all the textbooks, tympany, visible peristalsis, shock and collapse, rapid pulse, palpable mass, and Hippocratic facies are much discussed. Tympany or distention is rare in the early stages of obstruction, having been found by McKenty in only seven per cent. of cases in the first twenty-four hours. It is usually a late symptom, and signifies that toxic absorption is taking place or that strangulation or peritonitis have occurred. Visible peristalsis, while a valuable diagnostic finding, is of rare occurrence except in postoperative cases, and is apt to be a late symptom.

Shock is rare at the onset of obstruction and usually when it occurs is an indication that a complication has occurred, that strangulation, perforation, or peritonitis has added its mortality rate to that of toxic absorption. Rapid pulse rarely occurs early, a rapid, feeble pulse and the general symptoms of collapse giving evidence of strangulation, gangrene, or peritonitis.

A palpable mass may occasionally be observed, as the abdomen is not usually rigid or distended until complications have developed. Carcinoma, impaction, and intussusception are the most frequent types of cases in which a mass can be felt. Rectal examination or proctoscopy may show a carcinoma or an intussusception. Hippocratic facies of course usually signifies impending death. The temperature may be normal or subnormal until peritonitis supervenes.

The laboratory findings in acute intestinal obstruction are usually and correctly confined to the more simple procedures, as the importance of early operation makes prolonged investigation undesirable.

Examination of the blood will show a moderate leucocytosis early in many cases, although marked leucocytosis does not occur until the later stages, when complications have developed.

The blood chemistry will show an increase in blood urea, due to the toxemia, but this increase must of necessity be also a later development, although an earlier one than that of a developing acidosis.

The urine will show slight concentration and in late stages may show evidence of toxic irritation of the kidneys or of acidosis.

Examination of the gastric contents is usually confined to examination of vomitus or of material obtained during lavage, and will show nothing characteristic until the late symptom of fecal vomiting occurs. Early, however, the vomiting may be differentiated from that of pyloric stenosis by the fact that the gastric contents contain no food eaten at a remote period, that is, more than six or eight hours before.

The stools, if any are obtained at beginning, may, if they contain blood in considerable amount, lead to a suspicion of carcinoma or of intussusception.

The x ray examination is usually not desirable or necessary, although in an early, doubtful case a gastric series would show beautifully the exact point of obstruction if the barium meal were not vomited before reaching that point. In most cases, however, a colon examination by means of an opaque enema can be done with little harm to the patient and may be of much value in determining the site of exploration in suspected colon carcinoma. A simple x ray without an opaque meal can also be made without danger even in severe cases, the gas often outlining the intestine and showing the point of obstruction beautifully.

The diagnosis of acute intestinal obstruction, as will be seen from a study of the facts brought out in this paper, should be based on the findings of: 1, peristaltic pain, increased by food or cathartics; 2, persistent vomiting, not lessened by lavage, and 3, constipation, unrelieved by enema. Early in a case in which there is a question whether the condition at hand is due to true intestinal obstruction or merely to simple fecal impaction, it is justifiable to give a softening oil enema (castor oil and olive oil, four ounces of each) to be retained, and a moderate dose of castor oil by mouth, followed in four to six hours by a soapsuds enema and possibly a hypodermic injection of pituitary extract. In simple impaction of paresis this course will usually bring results. If no evacuation occurs, or if the symptoms are aggravated, a diagnosis of obstruction should be considered fairly well established, and no further catharsis attempted. The early physical signs and laboratory findings, as stated before, are not of much diagnostic value, being definite signs occurring only late in the disease. It is unjustifiable for a clinician to wait for fecal vomiting to establish his diagnosis or to allow a patient to go into a state of collapse from obstruction and toxemia.

DIFFERENTIAL DIAGNOSIS.

The principal conditions from which acute intestinal obstruction will have to be differentiated are as follows:

1. Acute peritonitis, from any cause, in which the history, high leucocytosis, and abdominal rigidity will serve as diagnostic aids, and in which, besides, early operation is also indicated.

2. Gallbladder colic, in which the localization and sudden onset and cessation of the pain, the fever and the icterus, will be of help.

3. Renal colic, in which the localization of the pain, the urinary and the radiographic findings are distinctive.

4. Acute poisoning, from food or other agent, in which a history of taking poison, with diarrhea and either early death or rapid recovery after catharsis and suitable treatment, will establish the diagnosis.

5. Pyloric stenosis, whose slower onset, delayed vomiting, and x ray findings will be of diagnostic importance.

6. Acute hemorrhagic pancreatitis, which is difficult to diagnose, but the symptoms of which call for immediate operation.

7. Uremia, in which the edema, urinary findings,

blood findings, etc., should not be difficult of demonstration.

8. Lead colic, in which the chronicity, history and associated muscular weakness will be found.

9. Angina abdominis and gastric crises of tabes, in which the pains are not persistent and do not last as long.

10. Gastrointestinal purpura and angioneurotic edema in which sensitization can usually be demonstrated and which clear up rapidly.

TREATMENT.

The treatment of acute intestinal obstruction is early operation. It is not within the scope of this paper, which deals mainly with the medical or diagnostic aspects of the disease, to discuss the methods of operation, but the writer wishes to emphasize the importance of refraining from extensive operations, the ideal procedure in a patient so weakened by toxemia as is the average obstruction case being an enterostomy or colostomy above the point of obstruction, done under local or nitrous oxide anesthesia. The more extensive operative procedures, which may be indicated, can be done later with greater safety to the patient. Too often, the temptation to do a complete job at the one operation results in the death of a patient whose life might have been saved by the simple drainage operation.

CONCLUSIONS.

1. The reduction of the present high mortality in acute intestinal obstruction depends upon early operation, i. e., operation in the first twenty-four or forty-eight hours after obstruction occurs.

2. Early operation implies early diagnosis and this can only be made by, a, dissemination of knowledge of the early symptoms among the laity, so that medical advice will be sought early, and b, instilling the

importance of early diagnosis in the mind of the general practitioner who first sees the case.

3. Medical and surgical textbooks, which pay scant attention to early symptoms and emphasize only the late symptoms, should be corrected.

4. A presumptive diagnosis of acute obstruction should be made from the three cardinal symptoms, peristaltic pain, persistent vomiting, and obstipation.

5. Operation should be performed promptly without waiting for extensive laboratory confirmation of the diagnosis and should be done preferably under local or gas anesthesia. The mortality rate is increased by ten or fifteen per cent. every twenty-four hours. It is better to operate and find no obstruction than to delay and have a dead patient.

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88 SIXTH AVENUE.

Acute Intussusception*

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Intussusception is the slipping of one portion of the intestine into that immediately adjacent above or below. The descending variety is by far the most frequent. Even a discussion of it will usually require more than one surgeon's experience as a basis. My four personal cases have been very interesting but are too few to justify the expression of strong personal opinions concerning the various phases of this condition. But every practising physician must be interested in it.

It is a form of acute intestinal obstruction. As soon as a doctor suspects this condition he will not take much rest until he has done his duty in the case. Diagnosis looms large, and is particularly important in intussusception because it is the great cause of acute obstruction in children, especially in very young children, who can give little aid in diagnosis.

Treves says that one third of all acute intestinal obstructions occur in children. Most obstructions in children are due to intussusception. Romanis (1) studied 374 cases in which laparotomy had been done (taken from the records of the St. Thomas's Hospital, London, from 1898 to 1917), and found that 234 or nearly two thirds occurred in children under twelve years of age.

Intussusception may develop in any portion of the bowel with a mesentery free enough to permit it, but the great majority begin near or at the junction of the small and large bowel. Of 100 cases reported by Clubbe (2) all but two involved the ileocecal junction, from the beginning or soon afterward. Only three were purely colic and one purely enteric, i. e., involved the small intestine alone. Sixty-four began with an invagination of the end of the cecum, twelve with an invagination of the ileocecal junction or valve, and twenty were double. By this is meant

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that they were primarily enteric, starting a few inches from the cecum and on reaching it causing a secondary infolding of the cecum. Most authorities consider that those beginning in the ileocecal region originate by an invagination of the ileocecal junction or valve into the large bowel. Clubbe distinguished between what he called the ileocecal and the ileocolic varieties, the latter beginning at the ileocecal junction and the former by an invagination of the end of the cecum. Of the ileocecal there were sixty-four cases and of the ileocolic there were twelve. Lorenz (3) also maintains that invagination of the end of the cecum, not of the ileocecal junction, begins the process in most cases. Three and a half years ago I thought I had made an original observation when I saw in a case that the invagination had evidently begun at the end of the cecum. I have since observed it in another case. It might have occurred in the other two cases so far as my observations went. It seems to be generally agreed that these cases begin at the ileocecal valve.

In making the diagnosis first consideration must be given to the evidence of acute intestinal obstruction, the cardinal symptoms of which are severe abdominal pain, some shock, vomiting, and constipation. But intussusception gives more atypical symptoms than any other of the acute obstructions and the fact that it usually occurs in young children makes the difficulties in diagnosis more troublesome. As a surgeon, I would not regard myself as competent to establish the diagnosis in the usual case, but would seek the assistance of somebody more experienced and competent in the handling of children. I think the most important feature to be considered is the placing of this responsibility where it belongs. If the diagnosis is made early enough operation can cure nearly if not every case. Pain in the abdomen is usually the first symptom. This pain is diffuse in character, shows periodical exacerbations and is often severe. In the place of constipation we usually have apparent diarrhea with tenesmus and blood stained mucous discharges. The intussusception may completely block the fecal current, but the invagination acts as a foreign body within the intestine which in its effort to expel the foreign body gives rise to the tenesmus and the excess of mucous and bloody discharge, with the passage of what feces may be located below the seat of obstruction. The temperature and pulse may be normal and a palpable tumor may be discovered.

The size of the tumefaction may vary from that of an egg to a large section of bowel. When it can be made out it assumes the general shape of the intestine and is frequently spoken of as sausage-shaped. Sometimes its shape yields to pressure. Although it begins usually in the ileocecal region, as it progresses it is dragging the turning in ensheathing portion with it and the enlarging mass continues to move in the line of the large intestine further and further away from its site of origin. Leichtenstern places the most frequent site of the tumor in the region of the sigmoid and then of the rectum. It may be found anywhere in the line of the large bowel to the anus.

The invagination obstructs the fecal current usually completely but this is not its greatest danger. The bloodvessels reach the intestine through its

mesentery which is being dragged into the ensheathing layer of bowel with the invagination, so that the bloodvessels become compromised by the constriction of the ensheathing layer and the nutrition of the invaginated portion suffers accordingly. The constriction progressively increases from venous stasis and exudation with consequent swelling of the invaginated portion so that the nutrition of the latter is progressively interfered with until gangrene occurs. The great object in treatment is to release the invagination before the stasis and exudation of the invaginated bowel make its reduction impossible or gangrene occurs. The latter development usually leads to a fatal termination. Clubbe did resection seven times with but one recovery.

If the reduction is delayed, adhesions tend to develop between the invaginated and the ensheathing portions of intestine. Sometimes after they have formed between the serous surfaces at the neck of the intussusception a gangrenous invaginated portion of bowel may slough off and be discharged by way of the anus, the patient recovering. Wichtmann (4) states that the mortality after elimination of such a sloughing intussusception is three per cent. Hermes says that this sloughing off and elimination is rare in children but is relatively much more frequent in adults.

Twenty to twenty-five years ago operative treatment received little consideration. The prevailing method was to invert the patient and inject by way of the rectum large quantities of air or water to force the retrogression of the intussusception which was undoubtedly successful in some cases. In 1905 Clubbe still used and advised it. He employed oil or warm saline injections in all cases with the patient under a general anesthetic and prepared for operation in case the injection failed. The necessity for operation was thus done away with in about ten per cent. of cases. The literature seems to show that since then these injection methods have been entirely done away with. Romanis says that the slight reduction of the lower portion usually accomplished can be most easily brought about by operation. Of his 374 cases treated by laparotomy, in 301 simple reduction was done with a mortality of twenty-six per cent.; in thirty cases reduction with appendectomy with a mortality of forty per cent.; in thirty cases resection and end to end union with a mortality of sixty-three and three tenths per cent.; in ten cases artificial anus with a mortality of one hundred per cent.; and in three cases lateral anastomosis above and below the (nongangrenous and non-resected) intussusception with a mortality of thirty-three and three tenths per cent. We thus see how the mortality mounts when it becomes necessary to do more than a simple reduction. The significance of the high mortality in the cases in which resection was done or an artificial anus was made, lies in the fact that in the latter the condition of the patient was so low that only an artificial anus was justified, while in the former there seemed still a chance to save the patient by resection.

The big fact here is that in more than eighty per cent. of these cases simple reduction sufficed. In my small group of cases simple reduction was accomplished in all four, and the mortality was twenty-five per cent., or only one out of four as in

Romanis's collected cases. The reduction was much more prolonged and difficult in the one patient who died than in any of the other three and this was realized at the time to threaten the prospects of the patient. The question as to whether resection should be done or not came up, but it was thought the patient would have a better chance without it. In only one of Romanis's cases, in which operation was performed within twenty-four hours after the onset of the symptoms, was resection necessary. He says that if symptoms have been present less than thirty-six hours one may feel fairly confident that reduction will be possible. Hipsley (5) operated in fifty cases but he had no death in any case in which operation was performed within thirty-six hours, although one patient died that had been ill thirty-six hours. Peterson operated successfully on a child, four months and two days old, for acute intussusception of thirty hours' duration. It was gangrenous and after resection end to end union of the divided intestine was accomplished by means of a Murphy button. On the fourth day the button was found at the anus and removed.

The last three of my cases have already been reported (6), but it may serve a good purpose to group them all together.

CASE I.—Male, three years and nine months old, was admitted to the University Hospital on July 27, 1917. About five days before he complained of pain in the left side of the abdomen and was given cathartics which seemed to relieve the pain. Two days later he began to have paroxysmal pain in the left side of the abdomen. Had had no appetite since and vomited several times. Bowels moved until the last two days during which only bloody mucus was passed. The child looked sick and pale. Pulse was rapid and rather weak, abdomen distended and tympanic. There was distinct tenderness over the left side of the abdomen. A mass was felt in the lower right abdomen of considerable size, rather movable, soft and tender. Dr. Winslow Drummond was called and he immediately made arrangements for a consultation. Patient was brought quickly to the hospital and operated upon at 9 p. m.

Under ether anesthesia, a right rectus incision was made. An intussusception from twelve to eighteen inches long was found involving the large bowel. Much difficulty was experienced in reducing it and the process was tedious. The invaginated portion of the intestine was found to have in it a small Meckel's diverticulum. The involved intestine was indurated and thickened, somewhat dark in color, and the coats seemed to have been bruised, especially in spots, by the efforts at reduction. It regained good color after prolonged applications of hot saline solution. On leaving the clinic the patient's temperature was 99.4, pulse 160, and respirations 32. Later he improved, but about 2:30 a. m. he began to get worse and died at 7:40 a. m.

The question of resection came up at the time of operation and in the light of later developments probably should have been risked, but at the time it was thought the patient would have a better chance without it. He evidently died too soon for peritonitis to have developed. *Élsberg* (7) says: "Surely at times a devitalized segment (of bowel) appears to be responsible for a lethal termination long before

there has been time for bacterial action to play a part in the result."

CASE II.—Male, thirteen years old, referred by Dr. George E. Shaffer, was admitted to the Northeastern Hospital on July 10, 1918. On the preceding day the patient was taken with severe abdominal pain and vomiting. There had been no bowel movement for two days when on the morning of admission he had a movement showing some blood. There was marked rigidity of the entire abdominal wall, tenderness in appendiceal region, and a diffuse pain around it. Dr. Shaffer had detected a lump between the last rib and McBurney's point. The intern had failed to find it but when the patient was under ether it was again detected. Appendicitis had been diagnosed. Operation was done soon after admission, with the McBurney incision. The basal portion of the appendix was concealed in an ill defined mass which exhibited much induration but no adhesions. The mass could not be moved into the incision and the appendix could not be released from its imprisoned position. The ileocecal junction was not involved in the mass. A higher incision was made along the outer border of the rectus muscle extending upward to about two inches of the costal margin. It was still difficult to outline and determine the character of the mass, and while it was being manipulated, suddenly the appendix was released and the cecum took its normal form. It was now seen that we had been dealing with an intussusception of the end of the cecum which had carried in with it that portion to which the appendix was attached. The cecal wall was much thickened by edema which also involved the appendix to such a degree that it now protruded rigidly through the lower abdominal incision. The whole of the involved portion of intestine, including the appendix, had a bluish discoloration indicating the probable threatening of a gangrenous process. This rapidly disappeared after the correction of the invagination. The appendix was removed, both wounds closed and the healing was uninterrupted.

CASE III.—Male, seven months old, about 8:30 a. m., October 8, 1919, manifested severe abnormal pain and soon began to vomit. At 9 p. m., Dr. M. V. Leoff was called and he in turn called in consultation Dr. J. H. McKee. Intussusception was diagnosed and immediate operation advised. This was begun about 2 a. m. at a private hospital, Dr. Leoff assisting. A right rectus incision exposed a mass which proved to be an intussusception. Gentle traction on the entering portion of the small intestine and pressure on the distal end of the mass led to slow reduction of the intussusception which proved to be of the ileocecal variety. The cecum was considerably thickened and indurated from edema. The wound was closed and dressed. Recovery was without incident and the patient was sent home in a week.

CASE IV.—Female, four months old, was perfectly well until the evening of October 29, 1919, when she suddenly and without any apparent cause began to cry. This continued all night and on the following day Dr. Israel Myers was called in. By the next day two stools had occurred but the pain continued, the stools concealing the intestinal obstruction. Dr. Myers called in Dr. McKee. No

abdominal tumor could be felt even by digital examination of the rectum. Operation was begun about 8 p. m. on the same evening at St. Agnes Hospital. Right rectus incision exposed a distended small intestine. The large bowel was found above and to the left side of the abdomen and was seen to contain an indurated mass which proved to be an intussusception. The proximal end of it was exposed with considerable difficulty near the midline at the level of the transverse colon. The entering portion of the small intestine was held firmly and closely to the posterior abdominal wall and was exposed with much traction on the surrounding viscera. The distal end of the intussusception was felt to extend more than halfway through the sigmoid loop and to move forward and backward within the intussusception showing that the layers were not adherent to each other. After prolonged and gentle traction on the small intestine and pressure from below on the end of the intussusception, it was slowly and completely reduced.

It was observed that as the final steps of the reduction were taking place the ileocecal junction appeared first, then the base of the appendix, followed by the whole appendix, and finally the end of the cecum successively. This would seem to indicate that in the formation of the intussusception the

last part to appear was the first to go in, i. e., that the first part to invaginate was the end of the cecum and not the ileocecal junction as commonly supposed. At the time I thought that this was probably a new observation but as shown in the earlier part of this paper it was long before pointed out. Healing was uneventful and the patient was taken home at the end of a week.

CONCLUSIONS.

The real problem in intussusception is to make prompt diagnoses general. If the diagnosis were as easy as in appendicitis the mortality of operative reduction would probably be less than that of appendectomy. If operative reduction were done in all cases within twelve hours after the onset of the condition there would probably be very few deaths from this condition.

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Fluoroscopy in Diseases of the Abdominal Organs*

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Fluoroscopy of the gastrointestinal tract has been practised for many years. Those of the Continental school, particularly the German and French, early employed this form of x ray in preference to the plate method. These pioneers were mostly internists. They were satisfied with information regarding motility, mobility, peristalsis, tone and position. They used plates sparingly in confirming these findings and in attempting to demonstrate actual lesions. These workers, many of them, established a fluoroscopic or x ray syndrome for each of the diseases and these syndromes varied somewhat according to the individual investigator. Some of these deductions, in view of our present knowledge, were not correct, but on the whole much valuable knowledge has thus been passed down to us. It was not long, however, before the special röntgenologist became a necessity and his enthusiastic devotion to this field of work has given us perhaps the most valuable of diagnostic methods. While we may not all of us agree as to the relative value of x ray plates in diagnosis, according to our experiences with good or bad plates and indifferent reports, few would dispense with them, and it is not fair to compare the plate method with fluoroscopy or vice versa; both have their limitations. When it is possible the ideal ar-

rangement provides for the use of both methods together without too much overlapping or expensive repetition. In large clinics where expense is an item it has proved satisfactory to use the fluoroscope to sort out the cases and those that prove interesting to plate. In the hands of the internist, however, the fluoroscope becomes an instrument to be used by him as he uses his stethoscope, ophthalmoscope, or other instrument, as an adjunct to the other clinical methods. It is concerning this kind of fluoroscopy with which this paper deals.

It is hardly necessary to caution against the dangers of fluoroscopy both to the patient and the observer. The necessary precautions should never be lost sight of, but in the modern apparatus protection is reasonably assured and our knowledge of dosage is such that only carelessness can result seriously. Very young patients, the old and those debilitated by long illness are relatively more susceptible than are the robust. The recent use of iodine or other counterirritants weakens the skin resistance. An exposure to a ray, the elements of which are a five inch gap to five mil., should not exceed twenty minutes within a period of two weeks as the effect of the ray is accumulative. It has not been proved that constant exposure has any constitutional effect on the fluoroscopist. The confinement in a badly ventilated space and the severe eyestrain are prob-

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ably responsible for the headaches and fatigue experienced by those doing this kind of work. Lead impregnated gloves of the heaviest kind are to be constantly worn, as the manipulation under the screen is a very important part of the examination. Considerably more than fifty per cent. of the information obtainable is brought out by this manipulation. It is useless simply to view the shadows on the screen. One might better take plates—and wooden spoons and other such devices are not practical.

Simplicity in technic is desirable but it must be rigidly standardized. The patient should not prepare in any manner except to refrain from eating breakfast the morning of the first examination, or luncheon if it takes place in the afternoon. A cup of clear tea or black coffee one or two hours before the exposure is allowable. If the individual is in the habit of taking mineral oil or any simple mild laxative every night, this may be allowed the night before, but no castor oil, salts, or other cathartics. There can be no objection to a small low enema. A barium meal, no matter how much of regular food elements are added, does not approximate normal food in its behavior in the gastrointestinal canal. But such a meal, when sandwiched between normal meals, tends more nearly to approximate the normal rate than when it is introduced into an empty collapsed tube or one that has been recently lashed into spasticity by cathartics. It seems to make little difference what sort of barium meal is employed so long as it is thoroughly mixed and sufficient barium is used—at least half a pound.

Many failures in fluoroscopy are caused by insufficient preparation of the observer's eyes. Ten minutes at least in the dark or dimly lighted room are necessary to relax the accommodation. If a number of patients are to be examined the thinnest should be taken first.

The patient, stripped to below the waist, is placed on the stand in the anteroposterior position. The heart, arch and lungs are quickly scanned for gross irregularities. Deep breathing will show up any inequality in the excursions of the right and left diaphragm. Such inequality may tell of inflammatory trouble below as well as above the diaphragm. The patient is next placed in the right anterior, three quarters oblique position. Holding the glass of barium mixture in his left hand he is told to swallow the meal rapidly. Observations on the esophagus through an elongated but otherwise reduced diaphragm are thus possible.

We can state, dogmatically perhaps, that any lesion in the esophagus that is capable of causing symptoms is accompanied by some dilatation above the site of the lesion. It may be only slight but the experienced eye rarely misses it. When the lesion itself is not sufficient to obstruct, the local spasm which accompanies it is the direct cause of the dilatation. The gastrointestinal canal throughout is particularly prone to spasm. Very slight irritation at any point will cause spasm in that zone, and wherever a valve is placed this valve is subject to spasm from not only local irritations but from distant parts in trouble as well. It is to the operation of this autonomic mechanism that we can attribute most gastrointestinal symptoms.

Armed with this knowledge and the means for observing the operation of the mechanism, diagnosis is made easier. When any defect or dilatation is discovered in the esophagus a plate or two should be taken to confirm, as it is not always possible fluoroscopically to differentiate between a malignant and a nonmalignant inflammatory process in the walls of the esophagus.

It will not be possible to describe in detail the manner of examining the stomach; only an actual demonstration would be of use here. It must be understood, however, that only by means of the deepest manipulation can the organ be observed satisfactorily, and it is examined from all angles and in all planes. It is possible to go over the posterior and anterior borders, as well as both curvatures, in a search for niche, filling defects, incisura or other abnormalities in outline or contour. If one will give sufficient time to it, these defects when present can be seen. We cannot always differentiate fluoroscopically between the filling defects caused by malignant and nonmalignant disease, so that when such a shadow presents and the finger printing or other distinguishing features cannot be seen, a plating should be done. This, however, does not frequently happen.

It does not require much experience to diagnose the character of the peristalsis, the size of the stomach, its tone and position, or the presence and location of spasm. These are all important items; they are, however, significant only to the diagnostician who understands the motor and other functions of the stomach normally or in disease. It is for this reason that the clinician armed with complete clerical and laboratory data should make the observations. If this is not possible then the fluoroscopist should be held down to a rigid standardized report of his findings and should not attempt to make a diagnosis.

In disease of the duodenum the fluoroscope comes into its own as an instrument of precision in negative as well as positive diagnosis. The manipulation here necessary is most difficult, but by patience and a degree of skill that can be easily acquired, nearly one hundred per cent. of cases of duodenal disease can be diagnosed fluoroscopically independent of all other findings. Induration and local spasm largely cause the filling defects that make duodenal or postpyloric ulcer evident fluoroscopically. It only requires a little experience and an application of deductive reasoning to differentiate these defects from those caused by adhesions, bands or pressure from without the canal. Malignancy, except by extension, is here so rare that it need not be considered in differential diagnosis.

The second and third portions of the duodenum are important to observe, as stasis and backtracking here frequently take place because of kinking or bands and the symptoms thus caused are misleading when the true conditions are not discovered. The diagnosis is difficult—in fact rarely possible by any other means than the fluoroscope. It requires considerable manipulation and maneuvering to bring out the shadows peculiar to such changes.

The position or the tone of the small intestine beyond the duodenum cannot be studied satisfactorily by means of the fluoroscope except where adhe-

sions or growths cause partial or complete obstruction. Here the distended section of intestine tells the story. The barium passes so rapidly through the small intestine that it is most difficult to make any satisfactory observations on it unless there is stasis at some point.

The first observation carries us through to the third portion of the duodenum. By the time this is completed, the experienced fluoroscopist has a definite knowledge of the motor function of the stomach. He estimates this by noting the character of the peristalsis, the tone, size and position of the stomach and the ease with which he is able to express stomach contents into the duodenum, so that it is not so necessary for him to check up by the three or six hour examination. If he has seen many cases of obstruction he can usually thus diagnose the condition without waiting. Still, if possible, this should be done as a refinement. The three hour interval gives the most information as a rule. It is not difficult to calculate approximately the amount of residue, and at this time if there is a residue it can be utilized again to fill out the pars pylorica and especially the cap to confirm any defects that might have been suspected but not positively proved at the first examination.

Over ninety per cent. of normal stomachs are empty three hours after a barium meal, so that the minor degrees of stasis may be demonstrated at this time, as well as the more pronounced degrees, while six hours after the meal only the more serious errors of motility are discoverable. Where plates only are used the three or six hour exposure is essential as the radiographer does not have the advantage of feeling and actually expressing the opaque contents from the stomach through into the duodenum as does the fluoroscopist. Twenty-four hours after the barium meal has been taken the colon normally should be filled with the opaque material and defects of any kind, malpositions and irregularities in tone demonstrable. But the barium enema, administered to the patient prone, and its mode of entrance observed fluoroscopically, is by far the most satisfactory method for diagnosing disease of the colon. This should not be done, however, until all barium from the meal has been evacuated in order that the emptying rate for the entire tract can be established.

It requires only a little experience to enable one to "type" a colon, and it is quite surprising how seldom a perfectly normal gut is to be seen. And it is not a little disconcerting to discover that a large percentage of patients we thought were constipated really show an increased motility, and inversely, many whose chief complaint has been loose and frequent bowel movements are found to be possessed of an inefficient or slow motor mechanism. In our gastrointestinal clinic at Cornell College we found that more than seventy per cent. of the patients suffered from one type or another of colonic disease—mostly functional to be sure and secondary perhaps, but no other changes could we find in the gastrointestinal canal.

An appendix that retains barium after the colon has been freed from it, is put under suspicion, but this does not necessarily mean an organic change beyond a lack of tone. But an appendix that is seen to retain a fixed position, or one which is kinked up

and remains in this shape is, in a large percentage of cases, found by the surgeon to be diseased. That an appendix cannot be visualized at any time in the course of examinations, does not mean anything one way or another.

Up to this point we have covered only those organic or functional changes that can be visualized directly. As has already been stated, the gastrointestinal canal is peculiar in its tendency to spasm,—spasm not only of its many valves but in between these gateways as well. The relative independence of its motor mechanism to systemic control is responsible for this provision. In health this autonomic system of semaphore signals and control is of nature's marvels one of the most wonderful; but in disease it seems to run amuck as though a lunatic was in charge of the switch tower. Hence the bizarre and puzzling symptoms with which the internist must reckon in gastrointestinal diagnosis. By means of the fluoroscope we can at least stand by and watch this erratic behavior and having observed it for considerable time we are able to utilize some of the manifestations in diagnosis. For instance, if one sees a stomach that is not unduly large in which the peristaltic activity all the way from the cardia to the pylorus is excessive and deep, and we can demonstrate that there is no obstruction at the pylorus or in the duodenum and that motility is increased, one thinks of gallbladder disease at once. This fluoroscopic syndrome has been proved peculiar to gallbladder irritation in a large percentage of cases, and again acting through the ileopyloric reflex, disease in the lower right quadrant is prone to cause spasm of the pylorus and antrum. So that if we observe a normal peristalsis up to the antrum but with definite spasm of the antrum and no local lesion to account for it, trouble in the lower right quadrant is to be thought of.

Unfortunately from the diagnostic viewpoint, there are other sources of trouble in the abdomen that are capable of expressing themselves in like manner, so that it is extremely dangerous dogmatically to ascribe this or that fluoroscopic syndrome to any particular lesion anywhere within or outside of the abdomen. It is a great help in these extragastric cases, but definite diagnoses cannot thus be made.

In order to check up on our fluoroscopic work, last year we went through the records at the New York Hospital. We reported these results to the Section of Medicine of the New York Academy last fall. Since then we have not been able to bring the report up to date, but the figures illustrate what we have been able to do in fluoroscopy.

We have taken one hundred consecutive cases from the records of our two surgical services at New York Hospital for the purposes of this report.

Dr. H. H. Fellows, of the first medical service, has made the research in the following manner: He examined first the records indexed under postpyloric or duodenal ulcer. There were thirty-one that had been diagnosed at operation by the surgeons as postpyloric or duodenal ulcers; twenty-eight of these had been correctly diagnosed fluoroscopically as duodenal or postpyloric ulcers. In three cases we did not indicate the exact location of the lesion. For instance, in Case 53, series 12, fluoroscopic diagnosis, postpyloric ulcer, the surgeon

who operated reported a pyloric ulcer, but the house staff filed this record under postpyloric ulcer. There may have been an error in dictation here, but this result we place in the doubtful list along with the two other cases. Case 59, series 15, and Case 64, series 17, in which the surgeon found duodenal ulcers, we diagnosed fluoroscopically as prepyloric lesions. There were twelve cases in which diagnosis at operation was gastric ulcer. This includes ulcer of the body of the stomach and its prepyloric and pyloric regions. Of these we fluoroscopically diagnosed ten accurately. In one case, No. 133, series 36, we gave an ambiguous report: "Antrum pulled to the right, cap points to left; stem on extreme right side. No filling defects." The surgeon found at operation a pyloric ulcer one and a half inches in diameter. We were evidently in a timid mood when making this report. We list this as a doubtful diagnosis. Case 149, series 41, we reported as negative fluoroscopically for ulcer of the stomach or duodenum. The surgeon found at operation an ulcer on the anterior surface of the stomach.

There were thirteen cases that had been operated in and diagnosed by the surgeons as carcinoma. In ten of these we had given our opinion that the lesion we found fluoroscopically evidently was carcinoma. In three cases the fluoroscopic reports were not clear.

In Case 213, series 93, the fluoroscopic report was: "At prepyloric region on lesser curvature there is a fold or incisure with pylorospasm. The second observation shows splenic flexure full of barium. A mass is felt below; it seems separated from the splenic flexure." The surgeon found a carcinoma of the ascending colon with the hepatic flexure bound down. In Case H. K. (Private Building), series 100, the fluoroscopic report was: "No filling defect of stomach; cap absent; cannot be filled." The surgeon found a large mass at the pylorus. As these reports were not complete, we list them as doubtful.

Up to this point we have fifty-six cases of which forty-eight were diagnosed fluoroscopically with approximate accuracy, leaving eight failures or doubtful diagnoses. Only one was a complete failure.

As we have only recently been keeping duplicate records of our findings in the fluoroscopic room, we have no means for tracing and checking up the large number of negative diagnoses that we have made. So in order to get some idea of what our percentage of correct negative diagnoses is, Dr. Fellows was obliged to search out the histories of cases that had been operated in for extragastric lesions, in which we had given a negative fluoroscopic diagnosis for organic disease of stomach or duodenum.

Among these cases in which the surgeons found extragastric lesions were some that we had in error diagnosed positively for gastric or duodenal diseases. Chronic appendicitis gives the largest number in the extragastric lists. There were twenty-two such cases. In nineteen of these we gave correct negative diagnoses for disease of the stomach or duodenum.

In Case 639, series 74, we reported thus: "Possible adhesions near the pylorus. Very doubtful?" The surgeon found the stomach and duodenum normal. He removed a chronic appendix.

In Case 508, series 63, we reported "A small filling defect on the lesser curvature and a space on the

greater curvature that does not take on the peristaltic waves." We gave a diagnosis of gastric carcinoma. The surgeon found small indurated areas in the pancreas (none removed for section). A chronic appendix was removed.

In Case 421, series 84, the fluoroscopic diagnosis was pyloric ulcer. The surgeon found the pylorus normal; he removed a chronic appendix.

Indexed under cholelithiasis and cholecystitis were fifteen cases that had been fluoroscoped. In twelve the surgeons sustained our negative diagnoses for organic disease of stomach or duodenum.

In Case 23, series 54, we reported "A permanent incisure on the greater curvature and an irregularity on the lesser curvature suggestive of gastric ulcer." The surgeon found a cholecystitis.

In Case 181, series 85, the fluoroscopic reports were: "First observation, inclined to exclude organic disease of the stomach or duodenum." Second observation "stomach large, peristalsis weak; some obstruction at pylorus; ulcer the best guess." The surgeon found a cholelithiasis with dense adhesions. In Cases 129, series 89, we reported "A permanent incisure on the greater curvature, pointing to an indefinite irregularity on the lesser curvature. No diagnosis given." Surgeon found cholelithiasis.

There were eight cases indexed under operations for adhesions. In all of these our negative fluoroscopic diagnoses for organic disease of the stomach or duodenum were upheld by the surgeons. In all but one our fluoroscopic findings suggested adhesions, but I cannot understand why we failed here, as our report (Case 56, series 60) is: "Greater curvature pulled to right but no evidence of adhesions." The surgeon found adhesions of the omentum making traction on the stomach.

We were in forty-eight cases out of fifty-four able to make correct, positive, fluoroscopic diagnoses. We were sustained in our negative diagnoses for possible organic disease of the stomach or duodenum forty-two times out of forty-six. We were most accurate in diagnosing postpyloric ulcer, adhesions, and in our negative diagnoses for organic disease of the stomach or duodenum. In carcinoma we would have done better if we had gone further than we did in reporting, but judging from these reports we must have been influenced considerably by other than the fluoroscopic findings, as I can see but little in the reports to sustain such diagnoses and it is only fair to acknowledge these wanderings.

This gives us a record of ninety per cent. correct diagnoses, with ten per cent. failures or doubtful results. And some of these doubtful diagnoses were not so bad when the conditions under which we did the work are considered.

While we have made no serious attempts to diagnose the extragastric lesions, such as chronic appendicitis, cholelithiasis or cholecystitis, in twenty-six out of forty-five such cases, in addition to excluding lesions in the stomach and duodenum, we were able to give the surgeons a hint that there was trouble at some point in the abdomen not in the gastrointestinal canal itself. Most of these reports read: "Stomach and duodenum fluoroscopically negative; spasm, increased peristalsis, or position of parts indicate extragastric irritation, adhesions, and similar conditions.

The Symptom Pain in the Diagnosis of Appendicitis*

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Celsus, who lived until the early part of the first century of the Christian Era, was the first physician, who, giving due consideration to the phenomenon of pain on the right of the abdomen, described and defined with the name of colic passion that symptom complex to which Reginald H. Fitz, an American, more than eighteen centuries later (1886), has given the universally accepted term of appendicitis. In like manner, all the modern medical men admit that one of the main symptoms of appendicitis is the subjective pain in the right lower quadrant.

Nevertheless, every case of acute appendicitis is ushered in by pain more or less severe but abrupt in onset, and referred to the epigastrium or to the midabdomen, while after a lapse of a few hours the pain becomes localized and more severe in the right iliac fossa.

In many instances, however, such pain is only elicited by pressure either on McBurney's or Munro's point, although the structure most frequently found under these points is not the appendix, but the ileocecal valve, situated in a line drawn from the anterior superior spine of the ilium to the umbilicus, four to five cm. (one and a half to two inches according to McBurney; 2.6 inches according to Munro) from the anterior superior spine. The base or root of the appendix, in the living subject, is on an average about two and five tenths cm. below the valve, on a level with the centre of Poupart's ligament (1) and corresponds on the skin to Lanz's point (2).

The pain in the right iliac fossa, in appendicitis, may be elicited by other means also: by inflation of colon with air (Bastedo's sign); by rectal palpation (Wachenheim's sign), or by gentle pressure on McBurney's point, while the patient, lying horizontally, raises his right leg, causing the corresponding psoas muscle to contract and force the painful appendix against the palpating fingers (Meltzer's sign); by traction on the right spermatic cord, inducing severe pain near the internal abdominal ring, due to irritation of the parietal peritoneum (Horn's sign); by firm, but slow pressure, over the descending colon, proceeding in an upward direction, so as to produce an antiperistaltic wave, or gaseous distention, which passing through the transverse and down the ascending colon will arrive at the cecum, producing cecal distention, and a severe lancing pain in the right iliac fossa (Rovsing's sign); or finally by pressing a little below the McBurney's point, while the patient is turned on his left side, in which position the swollen and inflamed appendix drops down and pulls on the mesentery, which is usually hypersensitive, in such cases (Rosenstein's sign) (3-4).

On the other hand, especially in the acute cases, the palpation of the appendiceal region is difficult or

impossible on account of the hyperesthesia of the abdominal wall and the spastic contraction of the overlying muscle (muscular defense).

Subjective local pain is present in the great majority of cases of acute appendicitis, but is by no means constant. J. B. Murphy has already remarked that adhesions between the appendix and the visceral peritoneum, do not as a rule cause pain; it is the adhesions to the parietal peritoneum only which produce pain (5).

The great Swedish surgeon Lennander goes still further, holding that the parietal peritoneum also lacks sensitiveness. The same opinion is entertained by William J. Mayo, when he states: "Unfortunately in some persons the parietal peritoneum is not sensitive. We have often seen patients, usually men about fifty, of considerable flesh, but not necessarily so, who have a colic, are quite ill for a few hours, who then take up their work, and perhaps in seventy-two hours are not very ill, yet when you open up the abdominal cavity in one of this type, you find it full of pus" (6).

Recently we have operated in several cases of acute appendicitis of the gangrenous, perforative type, in which neither the topography nor the intensity of the pain corresponded to the position or the degree of involvement of the appendix.

In one of these cases (R. P. of Union Hill, N. J.), there was, at the onset, tumultuous, colicky pain all over the abdomen, followed within a few hours by nausea, vomiting, general abdominal rigidity, and tenderness, more pronounced in the mesogastric region. At operation, performed eight hours after the apparent onset, a gangrenous self-amputated appendix, floating in a mass of purulent fluid, was removed. This patient, when repeatedly questioned, denied the occurrence of any previous attack of the disease, with the exception of a few dull pains, wandering about the abdomen.

A similar case occurred on August 29th of this year. A man aged twenty-two (C. L. De L.), after dinner, was taken suddenly ill with sharp colicky pains in the epigastrium, followed by vomiting and a temperature of 100.5° F. Upon examination there was found a moderate tenderness a little below McBurney's point. The leucocyte count was 12,000. At the operation, performed sixteen hours after the onset, we found a gangrenous retrocecal appendix of clublike shape, which was caused by the presence of an enterolith at the distal end of the ulcerated and perforated appendix. This boy did not remember having ever suffered from a previous attack of the disease, although, after questioning, he admitted having felt a transitory pain "across the stomach" and a backache believed to be lumbago, about four weeks before the real attack.

These cases show that in some instances appendicitis may be almost a silent, symptomless process (latent or quiescent appendicitis: "appendicitis lar-

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vata," as termed by Ewald), until a deep ulceration and perforation take place, giving rise to the characteristic clinical picture of acute appendicitis with peritonitis.

In fact, in many instances, the diagnosis of appendicitis *in vivo* has been impossible, in spite of a prolonged observation period in the hospital (seven or eight weeks); as happened in cases of pylephlebitis of appendical origin, simulating lung abscess (Halstead—7), or in cases of real pulmonary or subphrenic abscesses, following cases of unrecognized or neglected appendicitis (Hall, Babler, Hohlen, etc.—8-9-10).

In another case (N. De F.), there was initial colicky pain in the epigastrium, then vomiting of bile, temperature 102° F., and twenty-four hours later, only on deep palpation one could detect a slight pain in the right lower quadrant. Subjective pain in the appendical region was absent. The leucocyte count was 14,000.

The operation, performed thirty-six hours after the onset, disclosed the diseased organ completely matted to the external wall of the cecum, and concealed by the visceral peritoneum, covered by another thin membranous layer (Fig. 1). This disposition, called by some surgeons retroperitoneal hernia of the appendix, or appendicitis retroperitonealis, should be more appropriately called appendicitis juxtaecalis duplivelata, to emphasize not only the intimate connection the appendix has contracted with the cecum; but also the presence of a double veil, or membrane, completely surrounding and almost burying the appendix.

The outer membrane, called pericolice fold of Jonnesco, or Jackson veil, although interpreted by some authors as pathological production (11) is rather to be regarded as a reduplication of membrane which is constantly found during fetal or postnatal life (12).

Recent investigations of O. N. Eisendrath and W. Schnorr (13) have demonstrated that such a fold is a fine translucent membrane, the upper border of which is almost always at the level of the hepatic flexure, while its lower margin extends down to about one inch above the caput coli.

In some instances, this lower margin covers the entire cecum, else part or the whole of the appendix fuses with the ileocecal fold (bloodless fold of Treves) (14). Sometimes, as observed recently in a case (A. M.), the membrane extends across the anterior aspect of the ascending colon, and passing in front of the duodenum, fuses with the gastrocolic omentum (Fig. 2). Whatever interpretation is given to this condition, the fact remains that it alters profoundly the symptomatology of the inflamed appendix, especially in regard to the pain.

In another case (J. De L., a boy aged twelve), there was subjective pain in the left lower quadrant (the symmetrical pain of Moynihan) (15), but a slight tenderness, elicited by deep pressure on McBurney's point, and a leucocyte count of 17,000 with eighty-five per cent. polymorphs. Twenty-four hours after the onset, an operation disclosed a ruptured gangrenous appendix, hanging over the pelvis and floating in a purulent sac (pelvic abscess) the fluctuation of which had been felt through the rec-

tum before the operation. This case resulted in fecal fistula, which, however, healed in about six weeks.

A striking peculiarity in children is the rapidity with which the initial periumbilical or mesogastric pains are often followed by a sudden general rigidity and tympanites due to a precocious rupture of the appendix, which is not as yet endowed with an elastic submucosa, and to a consequent peritonitis.

Porter (16) calls attention to such a tendency to rapid perforation in young children. From his statistics it appears that seventy-three per cent. of appendices perforate at five years of age, while only twenty-five per cent. perforate between ten and fifteen years of age.

However, in children, there are instances in which a rupture of the inflamed appendix takes place with but a slight stomach ache, little or no pain, and upon opening the abdomen you find a walled off abscess. Cases of this nature have been described by McKechnie (17).

On the other hand, it is admitted that when the appendix has infundibular form and patulous base, a regurgitation of the products of inflammation (exudate) from the lumen of the appendix into the cecum and expulsion from the intestinal tract take place; consequently, a spontaneous recovery (*restitutio ad integrum*) is produced with but a few abdominal pains (appendicular crises of Talamon), little or no distress, and no sequels (appendicitis recedens).

Hans Spitzzy of Gratz reports cases of mild appendicitis, characterized by a slight reddening and by the presence of nests of oxyurides and ascarides in the tip of the appendix (18). This form is termed "appendicitis helminthica" and cases of it have been reported by Metchnikoff, Natale, Brun, Guinard, Girard, Bloodgood and Rammstadt (Deaver) (19).

TOXIC APPENDICITIS.

Another variety ought to be considered, that is, the toxic appendicitis. Here the general phenomena conceal the appendicular symptoms (Oddo) (20). The patient is suddenly taken ill, as though it were a grave acute poisoning, he appears depressed, his expression drawn, pinched, his tint leaden or subicteric, his eyes caved in and he vomits a black, tarry fluid (*vomissement noir appendiculaire* of Dieulafoy). His temperature shows a slight rise and more often, hypothermy; while his pulse is rapid, feeble, thready and intermittent. Constant fetid diarrhea, generally involuntary, albuminuria and hematuria are present.

Epistaxis, enterorrhagy and even fatal capsular hemorrhages have been observed. On the other hand, there is an insignificant pain or tenderness in the right iliac fossa, a symptom rapidly overshadowed and overwhelmed by the above described general phenomena which, unless the appendix is removed at once, and sometimes in spite of its removal, as in hypertoxic or fulminating cases, will end in collapse and death.

If any weight should be given to the histopathological researches of Letulle, no appendix is normal in any adult and from statistics of Taft on five hundred autopsies, thirty-six per cent. showed evidences of an attack of appendicitis, although not recognized

during life. Likewise Kraussold states that one third of all adult bodies show diseased appendices.

J. T. Williams and R. Slater (21) in one hundred and sixty-seven cases out of five hundred cases of laparotomies, performed for gynecological affections, found changes in the appendix and, although

in sixty-four cases the involvement of this organ was evidently secondary to an inflammation of the uterine appendages, yet in one hundred instances (twenty per cent.) they found cases of pure chronic appendicitis with negative history and negative symptomatology, without any concomitant inflammatory process in the pelvis.

Likewise, Ch. Gordon Heyd, of New York, has found out that the appendix shows pathological changes in sixty-nine per cent. of cases of cholecystectomy, in sixty-six per cent. of cases of duodenal ulcer, and

in fifty-four per cent. of cases of gastric ulcer (22). In all these cases pain is usually absent in the right iliac fossa.

On the other hand, this is often present in typhoid fever, due probably to an invasion of the parietal peritoneum (Curschmann).

Moreover, every clinician knows that in cases of acute right pneumonia and pleurisy in children, and sometimes in adults also, there is pain in the appendic region.

There are other instances in which pain in the right lower quadrant is caused by a calculus in the right ureter at the level of the appendix and in the female an inflammation of the right adnexa, especially of the right ovary, may simulate appendicitis.

The sudden rupture of a tube in cases of ectopic (tubal) gestation, the bursting of a tubal or tubo-ovarian abscess, the sudden twisting of an ovarian pedicle or the cord of an undescended testicle (cryptorchidism), or the strangulation of an inguinal hernia may all lead to a wrong diagnosis of appendicitis.

It is well known that the form of localized primary tuberculosis of the cecum, described by Dieulafoy as hypertrophic cecal tuberculoma, may be mistaken for a subacute or chronic appendicitis. Hollenbach (25) describes a case of tuberculosis of mesenteric glands simulating appendicitis and in one of our cases, F. S., a boy aged six, manifested a striking picture of a subacute appendicitis, while the operation showed a tuberculous ulceration of the small intestine with perforation near the ileocecal valve. Other cases of ileocecal tuberculosis camouflaging appendicitis have been described by A. O. Wilensky (24).

T. Silvestri (25) has reported forty-seven cases in which he found evidence of various foci of tuber-

culosis of lungs, pleura, joints and genitalia, all of which either preceded, accompanied or followed the attack of appendicitis.

Instances of mesenteric lymphadenitis simulating inflammation of the appendix are recorded by J. W. Struthers (26).

In another of our cases, a right floating kidney, severe sudden pain in the right iliac fossa with pain and tenderness at McBurney's point were the most conspicuous symptoms (Dietl's crises). A similar case has been described by Giordano (27). Edebohls goes further stating that from eighty to ninety per cent. of women suffering from movable kidney suffer from chronic appendicitis also and considers the latter as one of the chief symptoms of the former. A case of hepatoptosis mistaken for appendicitis has been reported by Altobello (28).

In many cases of so-called chronic appendicitis the real trouble was caused by a movable, distended or impacted cecum (29-30). The condition termed cecum mobile is produced by a congenital malformation of the mesocecum, by which the cecum enjoys freedom of movement and displacement. The pain caused by this anomaly is more severe when patient is standing, while it is at once relieved when he is lying on his back or on his right side.

Another peculiarity of the cecum mobile is that chronic constipation does not yield to laxatives and the x ray shows a retention of the bismuth for two or three days (31). Sometimes a chronic recurrent appendicitis has been masked by the process of actinomycosis either of the appendix or the ileocecal region. For the differential diagnosis, we refer to the splendid article of M. Hinglais (32).

Another important, though rare condition, which



FIG. 1.—Sketch drawn at the time of operation, showing the double veiled appendix.



FIG. 2.—Sketch drawn at the time of operation showing the acute angulation between the ascending and descending colon and a fibrous band in the course of the Jackson's membrane.

may closely resemble appendicitis is suppurative periostitis of the inner surface of the ilium. Tumors, like sarcoma, osteoma or chondroma of the iliac bone, may simulate inflammation of the appendix. Symptoms masking closely appendicitis have been observed in cases of recurrent amebic dysentery,

though the operation disclosed no appendicular involvement (33-34). Coli bacilluria also may closely suggest appendicitis.

Another well known cause of pain in the right iliac fossa is the occurrence of an ileocecal kink of Lane (35), which by interfering with the free passage of the intestinal contents from the terminal part of the ileum into the cecum, causes fecal stagnation, distention of the bowel by gas, a tumorlike mass, in correspondence of the ileocecal region, congestion of the appendix and colic resembling very closely appendicitis. G. Eusterman (36) calls attention to the abdominal cramplike pains due to organic cardiac or arterial diseases, especially arteriosclerosis, which form part of a syndrome called by some clinicians *angina abdominis* (36). Cases of this kind have been published by House, Moos, Mourou, Kauffmann, Ortner, Schnitzler, etc. G. Tedeschi particularly has demonstrated with his observations how a syndrome of pseudoappendicitis may be produced merely by sclerotic stenosis of the superior mesenteric artery (intermittent angiosclerotic dyspragia of Ortner; intermittent anemic dysperistalsis of Schnitzler) (37).

The enteralgias of hysteria, the "hysterical mimicry of appendicitis" as called by Nothnagel, and the crises of tabes should always be kept in mind when making a differential diagnosis of appendicitis. (Table I.)

A. F. Jonas (38) describes cases of appendicitis in which the seat of pain and tenderness is in the right hypochondrium and from the anatomical topography and pathological features, he concludes that in these cases the appendices are embryologically arrested or undescended.

The same may be said of cases of appendicitis in the left side due to failure of the large intestine to rotate as it does normally at the fourth month of fetal life (39).

Another observation has been finding the subjective pain referred almost invariably to the epigastric region in cases of subacute and chronic recurrent appendicitis, a condition probably due to reflex spasm of the pylorus similar to that occurring in cholecystitis, gallstones, intestinal adhesions, pancreatitis, etc. (40-41-42). It is for this pain that Paterson very appropriately suggests the term of appendicular gastralgia.

Aaron has been able to induce a referred pain or distress in the epigastrium, left hypochondrium, umbilical or precordial region by a continuous firm pressure over the appendical region and while such pressure is produced, pylorospasm may be noted with the fluoroscope. This test has been repeatedly confirmed by the operative findings (distorted, adherent or contracted appendices) and found by the author exceedingly valuable in deciding when and when not to intervene surgically for chronic appendicitis (43).

In some instances tenderness in the appendical region, preceded or not by subjective pain therein, but not accompanied by the other signs or symptoms of appendicitis, with the exception perhaps of fever, has been observed.

This transient syndrome, for which we would suggest the name of appendicodynia occurs at times in cases of acute rheumatism, tonsillitis, sinusitis,

pyorrhea alveolaris, saturnism, anaphylaxis, pernicious anemia, and in other conditions, and is probably caused by an irritation of the intrinsic nervous plexuses of the appendix, brought about by the presence in the blood of toxic products of bacteria or mineral poisons, (lead, arsenic), or foreign proteins (anaphylatoxins) or hemolytic substances, namely unsaturated fatty acids. Hunter (44), King (45).

In regard to pernicious anemia, N. M. Percy (46), records that out of twenty cases of operation for pernicious anemia seventeen showed evidence of an old disease of the appendix. However, in a typical case of pernicious anemia, seen in consultation with Dr. G. K. Dickinson of Jersey City, N. J., the appendicodynia developed about a year and a half after the onset of the primary disease and produced no complications, though the patient lived about six months longer, finally succumbing from cardiac decompensation and anasarca. This was the case of an Italian woman.

In another case, a girl aged twelve, sudden pain and tenderness developed in the appendical region with a temperature of 102°. The following day, while these symptoms subsided, pain and swelling of the ankles and knees developed, indicating an acute rheumatic affection of the joints.

A peculiar case was that of an Italian woman, aged twenty-five, in whom, about five weeks after delivery, following a sudden fright there developed a diffuse urticaria and who some days later was overtaken by intense abdominal pain in the right lower quadrant. There was tenderness but no rigidity on the McBurney's point, there was also constipation, mild leucocytosis (12,000) but no increase of temperature. The bimanual examination excluded any involvement of the adnexa. An ice-bag was put on the painful side, belladonna and benzonalptol administered by mouth, and within four days all symptoms referred to the appendix disappeared.

In consequence of these considerations, a mere pain in the right lower quadrant of the abdomen should not be regarded as a sure criterion to induce the surgeon to perform an appendectomy.

In fact, in many a case this operation has not helped the patient. The patient generally goes to another surgeon to be relieved of the pain, which is finally overcome either by correcting a dilated or displaced cecum (cecoplication or cecofixation) or by adjusting an incompetent ileocecal valve or by exposing in the wall of the gut and incising a spastic ileocolic muscle, following the suggestion of Groedel, or by removing an inflamed ovary or fallopian tube (oophorectomy, salpingectomy).

On the other hand, following the statistics of Bancroft (47), eighty-one and one fourth per cent. of patients complaining of digestive disturbances were cured by appendectomy. Furthermore, ninety-three per cent. of the patients operated upon early for acute appendicitis, according to Morf (48), ninety-five and one half per cent., according to Stillman (49), and ninety-six and one eighth per cent., as reported by Hugh Lett (50), in his statistics of one thousand cases operated upon at London Hospital, were cured by appendectomy.

When the inflammation is limited to the appendix

with little or no evidence of peritonitis, the number of cures reaches ninety-nine and one seventh per cent. (51), and whenever the operation is performed within twelve or twenty-four hours since the beginning of the attack (52), the mortality would be reduced to nothing (52).

Before concluding, the mention of a new impetus given to the diagnosis of appendicitis by x ray methods is worth while.

According to Kirklin (53), by the röntgen methods alone, it is possible to demonstrate from eighty to ninety per cent. of pathological appendices, yet, overenthusiasm in the exclusiveness of these methods may lead to erroneous conclusions.

A study of the serial röntgenograms of the appendix and the gastrointestinal tract (54), made by the surgeon and the röntgenologist together would, however, lead to as great a degree of diagnostic

accuracy as that obtained in case of fracture, by stereoscopic radiography.

SUMMARY.

1. The symptom pain in the right iliac fossa, though found in the majority of cases, is not constant, being absent particularly in cases of chronic latent appendicitis, or appendicitis with referred symptoms (appendix dyspepsia of Moynihan), appendicitis juxtacecalis duphivelata, toxic appendicitis, and in cases of silent appendiceal abscesses giving metastases to other organs through the portal or the lymphatic system.

2. When present, the local pain is changeable in regard to its position, character, and time of its appearance.

3. As a rule in all acute cases the initial pains are of paroxysmal or cramplike character, and referred to the epigastrium or to the mesogastric

DIFFERENTIAL DIAGNOSIS OF APPENDICITIS

Stomach	Duodenum	Ileum cecum
Acute gastritis	Acute duodenitis	Enteralgia
Acute gastroduodenal catarrh	Chronic duodenal ulcer	Enterospasm
Chronic gastric ulcer (gastric)	Perforated duodenal ulcer	Enterolithiasis
Perforated gastric ulcer		Acute enteritis
Epigastric hernia		Gastritis
Omentum	Mesentery	
Omental hernia	Cyst	Dysentery { epidemic { bacillary { amebic
Strangulated omental hernia	Fibroma	Chronic intestinal stasis
Omental torsion	Fibromyoma	Intestinal obstruction { volvulus { intussusception { ileus
	Sarcoma	Perforating ulcer of ascending colon
	Lymphosarcoma	Enteroptosis
	Neuromyoma	Incarcerated or strangulated intestinal
		Tuberculosis of the ileum and ileocecal
		Diverterculitis of colon
		Carcinoma of colon
		Ileocecal valve obstruction (or stenosis of the sigmoid)
Pancreas	Liver and Gallbladder	Urinary Apparatus
Acute pancreatitis	Hepatic abscess	Acute cystitis
Lithiasis	Perihepatic abscess	Floating kidney with or without Dietl's crises
	Hepatoptosis	Floating kidney with twisted ureter
	Cholelithiasis	Colibacilluria
	Acute cholecystitis	Nephrolithiasis { uric { phosphate { calcium oxalate { cystin
	Empyema of gallbladder	Pneumophrosis
	Gangrenous cholecystitis	Perinephritic abscess
	Chronic cholecystitis	Multiple abscess of right kidney
		Septic infarct of right kidney
		Septic nephritis
		Ureteral calculus
		Hydronephrosis
		Pyelitis
Cecum	Muscles	Nervous System
Perforating ulcer	Psoas abscess	Appendicæalgia or appendicular colic
Distention or impaction	Acute "stitch"	Herpes zoster of the 11th and 12th intercostal and 1st and 2nd lumbar nerves
Cecum mobile	Tonic contraction of ileocolic muscle	Tabetic crises
Primary typhlitis	Subphrenic abscess	Nxurasthenic and hysterical enteralgias
Diverterculitis cæci		
Carcinoma		
Sarcoma		
Peritoneum	Female Genital Organs	Male Genital Organs
Appendix epiploica (inflammation or torsion)	Dysmenorrhea	Cryptorchidism with
Diverterculitis	Menopause	A. orchitis
Bones	Acute salpingitis R. S.	B. epididymitis
Pott's disease	Pyosalpinx R. S.	C. twisted cord
Tuberculous hip	Tuboovarian abscess R. S.	Deferentitis R. S.
Rheumatoid arthritis of the spine	Ovarian abscess	
Suppurative peritonitis of the inner surface of the ilium	Acute oophoritis	
Sarcoma	Suppurating ovarian cyst	
Osteoma	Twisted pedicle of an ovarian cyst	
Chondroma of the iliac bone		
Bloodvessels	Lymphatic System	Structures Interfering with Prostate
Thrombosis of mesenteric vessels	Acute adenitis and tuberculosis of	A. Congenital
Angina abdominis	A. iliac glands	1. Jackson's
Aneurysm of right iliac artery	B. ileocecal glands	2. Ileocecal kink of Iaué
	C. mesenteric glands	B. Acquired
	Parasites	1. Adhesions
	Appendiceal helminthiasis	2. Bands
	Oxyurides	
	Ascariids	
Infections	Appendicodynia	
Lobar pneumonia R. S.	Rheumatism	C. Primary anemias { pernicious anemia
Acute pleurisy R. S.	tonsillitis	{ hemolytic jaundice, etc.
Typhoid fever	pyorrhea alveolaris	{ furticaria
Actinomycosis	dental infection	{ eczema
	paranasal sinusitis	{ asthma
	saturnism	{ serum disease, etc.
	hydrargyris	
	arsenical poisoning, etc.	
		D. Anaphylaxis, ...

region, and almost always accompanied by nausea and vomiting, followed by pain, rigidity and tenderness in the right iliac fossa, a rise in temperature and an increase in the number of leucocytes (Murphy).

4. The subjective pain and tenderness in the right iliac fossa become evident as soon as the diffuse initial pain subsides.

5. The epigastric or midabdominal pains in children, generally overshadow the pain in the right lower quadrant, being rapidly followed by symptoms of general peritonitis, due to precocious rupture of the appendix. There are, however, a limited number of silent cases of appendicitis which either clear up by spontaneous drainage into the cecum, or end by a slow process of gangrene and periappendicitis which form a localized walled off abscess.

6. In chronic recurrent appendicitis the subjective pain, generally, is not referred to the right iliac fossa, but to the epigastric region, probably due to a reflex pyloric spasm.

7. The mere pain in the right lower quadrant, not accompanied by the other chronopathological symptoms, is not sufficient evidence of existing appendicitis, but rather of reflex origin, as in lobar pneumonia, typhoid fever, cholelithiasis, etc., else the symptom of a calculus in the right ureter, or of oophoritis, or oophorosalingitis.

8. Any appendectomy based exclusively upon the symptom pain in the right lower quadrant may spell failure as far as the therapeutic result is concerned, whereas, when performed early, in conditions referred to, it accomplishes a cure in about ninety-six and one eighth per cent. of all cases and ninety-nine and one seventh per cent. in cases of localized appendicitis without peritoneal involvement (Lett, Deaver).

9. Other abnormal or pathological conditions of the abdominal organs, as for instances: A right

floating kidney, movable cecum, ileocecal tuberculosis, adenitis of mesenteric glands, especially tuberculous, ileocecal actinomycosis, acute suppurative peritonitis of the inner surface of the ilium, tabetic crises, anginoid pains due to sclerosis of the superior mesenteric artery, and other conditions, should always be borne in mind when making a diagnosis of appendicitis.

10. The occurrence of toxic appendicitis, as described by the French authors, is rare and should be more properly classed as fulminating appendicitis.

On the other hand there are a certain number of cases, characterized by transient tenderness and pain in the appendiceal region and by absence of other signs or symptoms of appendicitis, which occur sometimes in the course of some infectious diseases (acute rheumatism, tonsillitis, etc.) or mineral poisoning (saturnism) or primary anemias (pernicious anemia) or anaphylactic disturbances (urticaria, eczema, serum disease), and undoubtedly are due to toxic substances in the blood stream which stimulate and irritate the nerves of the appendix without causing any clinical sequence in it. For this group, we would suggest the term *appendicodynia*.

11. The roentgenology of the appendix and the gastrointestinal tract requires further development. The collaboration of the surgeon with the roentgenologist would enhance the accuracy of diagnosis.

12. Appendicitis is as a typical as any other abdominal affection, therefore, neither pain nor tenderness, nausea nor vomiting, fever nor leucocytosis are to be considered as pathognomonic symptoms; but the discrimination of these fundamental symptoms and signs, and above all the comprehension of their development and interrelations are sufficient evidence to warrant a positive diagnosis of appendicitis and a timely intervention by the surgeon.

346 PALISADE AVENUE.

The references will appear in the author's reprints.

The Cause and Prevention of Gastrojejunal and Jejunal Ulcer*

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The problem of the postoperative gastrojejunal or jejunal ulcer is most important and particularly baffling. For whereas in the ordinary primary varieties of gastric and duodenal ulcer we have had nothing at all to do with the creation of an unhealable defect, in the secondary postoperative ulcers we have ourselves ploughed and planted the field upon which, later, an ulcerating defect appears, persists, and fails to heal. Truly, gastrojejunal or jejunal ulcer following operation is an experimental ulcer, just as experimental as if one had done the various steps in its production upon a laboratory animal. The baffling part of the situation lies in the fact that although the entire biological history of this experimental ulcer is entirely open to us, no success follows the many and repeated attempts to clear up the mystery and the essential cause still eludes us.

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The cases of gastrojejunal or jejunal ulcer that are being reported in the literature are apparently growing in number. Mandl's survey shows that there are over two hundred cases in the German literature alone. I agree with Horsley that for every case of actual ulceration in the line of the gastroenteric stoma there are surely other cases of hyperemia, inflammation or irritation which, in many cases, do not come to operation and which, in others, disappear spontaneously. Such cases in their symptomatology would mimic accurately the actual ulcerations.

The dominant factors which precede the appearance of the secondary ulcerations include, 1, an operation of some kind, and 2, a preexisting gastric or duodenal ulcer.

I mention the operative factors first for here one deals with fairly well known factors. The opera-

tion includes a number of general components which are common to all abdominal operations and, therefore, can surely be excluded from discussion as etiological causes for the appearance of secondary ulcerations. One is then left with the actual manipulations necessary in the fashioning of the stomach. Various men have implicated in turn every factor which enters into these manipulations: the position of the stomach, the use of clamps, the use of non-absorbable suture material, marginal necrosis, injury of tissue, etc. The very fact that opinions have gone from one to the other, and have covered them all, necessarily implies that no one of them has been entirely satisfactory and that probably all of them are only incidents—perhaps important but not necessary incidents—in the making of the secondary ulceration. And surely if these factors were operative to the extent to which they are said to be, the proportion of gastrojejunal or jejunal ulcers appearing after operation would far outnumber the two or three per cent. which these secondary ulcerations are said to number.

The second dominant factor in the situation is the presence of an ulcer in the stomach or duodenum for which the operation is undertaken. The presence of the ulcer implies all those changes in function, in the chemical as well as in the motor powers, which have been widely discussed in the past few years. These, too, have been implicated, especially the change in the chemistry with the hyperacid condition usually accompanying ulcer, in the production of the secondary ulcers. The facts here are similar to those just mentioned. The knowledge which we have of the anteoperative and postoperative variations of the normal stomach functions indicate all too clearly that it is extremely probable that the changes in the chemical function, as well as those in the motor function, are secondary and accompany manifestations of a diseased condition of which the concrete result is an ulcerating defect which refuses to heal. One knows quite well that in the immediate period following the making of a gastroenteric stoma any hyperacid condition of the stomach is likely to depreciate in its intensity even if it is only a temporary phenomenon; and yet there are numerous cases of secondary ulcer at or at some distance from the stoma, which appears while the total gastric acidity is still diminished and before the depreciated condition of the gastric juice is compensated by an increased production of acid. For these reasons, and especially because the number of cases of secondary ulcer are proportionally small, I do not believe that the changes in physiology are essential to the persistence of an unhealable defect.

Practically all the cases of secondary ulcer have followed operations for primary ulcers in the stomach or duodenum. The exceptions are those very few cases—both numerically and proportionally—which have followed resection and gastroenterostomy for carcinoma of the stomach. This brings up a very important point. In the first place it places a large share of the burden of guilt upon the presence of the primary ulcer in the stomach or duodenum. In the second place, the occurrence of the secondary ulcerations after a primary operation for carcinoma only makes one think that this is really no exception to the rule, but rather that in these cases

of carcinoma the malignant growth was engrafted upon a preexisting ulcer. The essential facts, especially the proportionate numbers of ulcer, engrafted carcinoma and gastrojejunal or jejunal ulcer, bear this statement out exceptionally well. Evidently whatever changes the carcinoma has made have not removed those earlier attributes of benign ulcer which are so essential to the formation of the primary ulcer or of secondary ulcerations at subsequent periods. So that a situation which is at first somewhat disturbing is really supporting; one can say with perfect truth that secondary ulcers at the stoma or near it in the jejunum occurring after primary operations upon the stomach or duodenum all follow a preexisting ulcer in the latter locations.

At times, during operations in the upper abdomen away from the stomach and for conditions other than ulceration, it becomes necessary to do a gastroenterostomy. To give only one concrete illustration of that to which I have reference, let me say that sometimes in doing difficult secondary operations upon the gallbladder or biliary passages, the stomach or duodenum is accidentally opened. At the conclusion of the manipulations it seems to the operator that in order to guard the suture line in the stomach or duodenum, it is necessary to exclude the pyloric end of the stomach and to do a gastroenterostomy. The point which I wish to bring out here is that under such conditions the stomach and the duodenum are guiltless of any preexisting ulcer, or, so far as one can tell, of any preexisting ulcer tendency. I myself have seen a number of such gastroenterostomies. I have never, however, observed a secondary ulcer appear later either in the stomach or in the jejunum, nor have I been able to find such a one recorded in the literature under such conditions. The importance of this observation is very great, for it indicates that the presence of the preexisting ulcer, or so-called ulcer tendency, is one of the two most important factors in the formation of secondary ulceration.

This only upholds the present day majority opinion that secondary ulcers at the gastroenteric stoma, or at some distance in the proximal jejunum following primary ulcerations in the stomach or duodenum, are essentially the same lesions, with similar morphology, subject to the same etiological causes and laws of development, produced by a similar mechanism, characterized by similar accompanying changes in function and noted by similar symptomatology. That such secondary ulcers do not appear more frequently is a compliment to the skill of modern surgery and a monument to the protective powers of the human animal organism; for the operation has produced ideal conditions for the further appearance of ulcers and only a small number—two to four per cent.—of “takes” become recorded.

The conviction is therefore unescapable, that whenever the true etiological cause of the primary ulcer is found, that of the secondary ulcer will also be available; and that whenever we have the cause of gastrojejunal or jejunal ulcer, the etiology of gastric ulcer will become common knowledge.

The recounting of these facts is essential because they point out clearly that all our available knowledge in regard to these secondary ulcerations can be

summarized in a number of known factors which are common to all cases of postoperative secondary ulcer at the stoma or in the jejunum, plus one unknown common factor—the elusive ulcer tendency or cause.

The available information in all cases of secondary ulcer points to the fact that in all reported cases the type of operation which has been employed has included a gastroenterostomy, in some cases employed alone, in others aided by an exclusion operation, and in still others as part of a resection operation. Under these circumstances the gastroenterostomy itself necessarily looms up as an overshadowing factor dominating the entire situation, because of the fact that it is the one controllable factor in the surgeon's hands. To put it mathematically, post-operative gastrojejunal or jejunal ulcer equals a pre-existing ulcer or ulcer tendency plus a gastroenterostomy. Necessarily the omission of any item from

this equation nullifies the result; if one omit the gastroenterostomy one obviates secondary ulcerations at the stoma or in the proximal jejunum; if one practises gastroenterostomy, one simply invites the appearance of more of these ulcers. This is the important lesson which one must learn.

I realize that there will be times when gastroenterostomy apparently must be done. But the number of such emergencies must be very small and with greater practice, skill, and experience they will grow smaller. For the average case other types of operation had better be chosen, those types in which gastroenterostomy plays no part. I speak of the pyloroplasties and the stomach resections of the Billroth I type, as well as sleeve resections for ulcers in the midgastric region. Perhaps much of the dissatisfaction with the operation of gastroenterostomy can be explained and prevented on this basis.

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Dietetic and Treatment Regulations in Gastroduodenal Ulcer

By ANTHONY BASSLER, M.D.,

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There have been a number of requests for a detailed plan of the treatment employed by me in gastric and duodenal ulcer. No claim is made for originality in any way, because it really is a combination of the initial fasting of Ewald's method, the hourly milk and cream feedings and alkaline powders of Sippy, my own diet for working down hydrochloric acid secretion, and x ray therapy. Both of the latter were advanced in 1910 and have been employed steadily since then (1).

The treatment is begun with no food by mouth for twenty-four to forty-eight hours. During this time the patient is given calomel quarter of a grain every fifteen minutes for eight doses, and Carlsbad salt twelve hours after finishing and at twelve hour intervals during the fasting period. Cool but not iced water is allowed to be drunk in sufficient quantities to allay thirst. Alkalies are administered from the beginning to neutralize any gastric juice secretion that may be present. During the fasting period ten grains each of sodium bicarbonate and bismuth subcarbonate are given every three hours, six doses in all in twenty-four hours, there being an interval of six hours through the night.

The feeding is then begun. Three ounces of a mixture of equal parts of cream and milk are given every hour from 7 a. m. to 7 p. m. for three days (1835 calories), and the alkaline powders of sodium bicarbonate and bismuth subcarbonate. To keep the bowels open an alternating powder of sodium bicarbonate and calcined magnesias are given midway between each feeding. This corresponds to the first three days' method of Sippy, and represents about 1325 calories a day. On the evening of the second day of this feeding note is made if there is any free acid secretion residual in the stomach. This is done usually at 11 p. m. by aspiration of the

stomach contents with a fractional test tube and testing the return or by swallowing a gelatine capsule having an extension of string inclosed in the capsule impregnated with congo red or dimethyl and dried and withdrawn after being in the stomach fifteen minutes. On the finding of a positive acid, the urine is voided and passed again in an hour, note being made of the reaction of the last specimen. If no acid is present in the stomach (even if the urine is slightly so) no alkalies are given throughout the night for the next fifteen days of the bed treatment. Generally by this time the stomach is negative to acid and the urine also. If acid is met with in the stomach and urine also, alkalies are given at three hour intervals throughout the night for the remainder of the days in bed in quantities to keep the urine alkaline or neutral to litmus paper. Modification here depends upon the reaction of the urine, this being noted at the end of the day and before feeding is resumed in the morning.

On the sixth day from beginning the treatment, a mixture of eggs, cream and milk is given at hourly intervals. Soft eggs and cereals are not employed as Sippy advises, for the reason that whole eggs, and especially when they are cooked, cannot be accurately controlled in quantities. Cooked eggs had better not be given, and no cereals should be given until after the bed treatment is terminated, for they somehow tend to diminish the best results. The mixture I employ is the following:

	Amounts at feeding					Time	Number
	Milk	Cream	Eggs	Calories			
6 to 9 day	3½ oz.	25 oz.	25 oz.	2	2050	hourly	13
9 to 12 day	4 oz.	22 oz.	34 oz.	3	2650	hourly	13
12 to 15 day	4½ oz.	20 oz.	44 oz.	4	3275	hourly	13

From the fifteenth to the twenty-first day the feedings are in five ounce quantities of equal parts

of milk and cream. Four eggs in the day are allowed cooked in any soft way. At this time forty grams of sugar are allowed, not in the form of saccharose (cane sugar) which stimulates acidity and tends to constipation, but as lactose, maltose, etc. The feedings at this time are extended to two hour intervals and the milk and cream mixture on thickly buttered toast at two meals is allowed. (This represents 3450 calories a day). Effort is made in these six days to lengthen the interval of feedings so that on the twenty-first day meals of milk, cream, eggs, bread and butter and sugar and milk and cream are given at eight, twelve, four and eight o'clock with one or the other of the alkaline powders one hour after each of them and a milk and cream feeding at ten, two, six and ten p. m., followed by a powder.

We must agree with Sippy that the aftertreatment of these patients is most important. I find, though, that the hourly feedings with city people are not practicable and the feedings of milk and cream hourly between a light breakfast, luncheon and supper, even with the thermos bottle method he advises, need not be followed. For the first month out of bed I do not allow soft or strained foods, such as jellies, marmalades, vegetables, or leguminous purees as Sippy advises. Instead patients are kept absolutely on the four foods mentioned above, and a diet which represents 3780 calories a day is strictly maintained. Such a diet is given below.

The diet is a temporary one and is to be continued until a change is made. The plan is not to partake of any solid foods whatsoever and to take the foods that are suggested at regular intervals of four hours during the day, making sure that a strict regularity is preserved and that the foods are divided up rather evenly in quantity for each time. A glass of plain fresh milk and perhaps a few crackers should always be taken between meals and before retiring, and an extra glass of milk during the night if there is distress in the stomach.

The diet consists essentially of only four foods, namely, eggs, fresh milk and cream, well cooked cereals, bread and crackers and nothing else in the food or fluid line (excepting plain water) should be taken. The eggs may be eaten raw or cooked in any form, or may be taken in the milk. The milk may be warmed if desired, but should not be taken too hot or too cold. The ten minute modern breakfast foods or any form of oatmeal should not be eaten, the old fashioned forms of ground corn, farina, rice, tapioca or sago, well cooked being the best. The bread should not be too fresh (one day old), any of the sweetened or unsweetened crackers can be used and all forms of simple cake, providing there are no nuts, raisins, seeds or preserved fruits in it.

The total amount of food in one day should be: four eggs, one quart (four tumblerfuls) of milk, one quarter of a pound of fresh unsalted butter, or one eighth of a pound of butter and an extra quart of milk, two rolls or four medium thick slices of white bread, one quarter of a pound of baker's cake or crackers, one half pint of fresh cream, and one quarter of a pound of cereals.

On this four meal a day plan with the interval

feedings I use eight powders each taken one hour after a feeding of any kind. During this first month out of bed the activities of the individual are restricted, this with the initial bed treatment taking eight weeks.

After the eighth week the eight, twelve, four and eight o'clock meals are diversified with the following selections, plain milk being taken midway between meals and the alkaline powders one hour after each feeding: Purees or creamed soups (barley, rice, peas, beans, celery); gruels (flour, cracker, barley, indian meal, farina). Plain crackers, baker's cake, pound cake, toast, rolls, jellies, rice, tapioca; ground or mashed vegetables; puddings, rice, tapioca, bread, cracker; custards, vanilla and chocolate, blanc mange, whips, and souffles; gelatines, plain ice cream, malt, milk cocoa, cocoa and chocolate.

This is kept up for four months when the following diet is prescribed and the powders changed to a combination of the two which were used before. The following is the combination which is used most frequently:

Magnesia usta	}	aa 15.0
Bismuthi subcarbonatis		
Sodium bicarbonatum		
Sacchari lactis		
Fiat pulv.		

Sig.: Take a teaspoonful in water after meals.

The general plan of the diet is to take three moderate sized meals at regular intervals during the day, and to take supplemental meals of milk, reinforced with cream, cocoa and crackers between meals and before retiring. Altogether food should be taken at least five times during the day. All of the solid foods should be tender, cut very fine on the plate and thoroughly masticated before swallowing. Olive oil may be taken before the main meals in hypersecretion and hypermotility.

Foods permitted for main meals are: beef, lamb, and chicken, roasted or broiled and taken only once a day; fish, any kind and in any form excepting fried, taken once a day; eggs in any form, other than fried, and taken once a day; cereals (with the exception of oatmeal and shredded wheat biscuits) well cooked and taken with cream in the mornings; vegetables, any that are well cooked and mashed with the exception of green vegetables; tubers, such as baked or well mashed white potatoes, squash, parsnips and turnips; desserts, any made of milk, cereals and jellies, no fruits, berries or nuts. Butter, cream, milk and cereals and eggs still remain the main foods of the daily diet. If the symptoms become marked again these should be the main articles of the diet for a while, when the more general plan may be followed. The best drink at the meals is vichy or any alkaline water.

At the end of six months a normal diet is employed. The following list of foods that will be especially injurious and must not be eaten is given to the patient:

One or two minute cooked breakfast foods; rough vegetables such as cabbage, sprouts, cauliflower, artichokes, asparagus, beets, celery, corn, cucumbers, kohlrabi, onions and tomatoes; foods which contain pits, seeds or skins, or nuts; canned or smoked meats or fish; lobster, crab, shrimp;

cheese of any kind excepting cream cheese; too much pastry, especially that cooked in molten fat, such as doughnuts and fritters; foods that are too sweet, such as jams; fruits such as cherries, cranberries, figs, grapes, musk melons; coffee, strong tea, alcoholic and malt beverages.

During the second month x ray treatments are given to the stomach, these usually being six in number, given at five day intervals. The patient is x rayed on an empty stomach which contains two

ounces of bismuth subcarbonate. The exposure at twenty-four inch distance is one minute, five to ten milliamperes, five inch spark gap, two millimeters of aluminum and a thickness of sole leather used as filters. Occasionally some form of organic iron is taken by mouth or a ferruginous preparation by hypodermic injections.

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Some Difficulties in the Diagnosis of Peptic Ulcer*

By A. WIESE HAMMER, M. D., F. A. C. S.,
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The correct diagnosis of peptic ulcer is beset with many difficulties, and surgical authorities are widely at variance as to the proportion between the number of gastric and duodenal ulcers encountered. Moynihan (1) asserts that more errors are made in the diagnosis of gastric ulcer than in that of any other abdominal disorder. He says that duodenal ulcer is most often found in place of gastric ulcer and that not infrequently gallstones are found when a gastric ulcer has been diagnosed. He believes gastric ulcer to be rather rare, and that the x rays and operative measures are alone corroborative means of diagnosis. There is, as may readily be imagined, a variety of conflicting statistics on the subject, but by far the greatest number of ulcers are of the duodenal type, in the proportion of about three to one.

In a study of a series of nearly three thousand cases of duodenal and gastric ulcer, Graham (2) asserts that duodenal ulcers have a longer course in years than do those of the gastric type, because duodenal ulcers do not enjoy the chance of latency encountered in gastric ulcers. The history of ulcer extending over a long period of time favors the duodenum as the seat of the process. In this ulcer hemorrhage is less common than in the gastric variety. In duodenal ulcer, night pains are usual, so that this variety is often confused with cholelithiasis. On the other hand, in gastric ulcer bloating is more frequent and coarse and large amounts of food are more likely to produce pain than in duodenal ulcer. Continuous symptoms are characteristic of gastric ulcer only. Hence the great difficulty of diagnosis in the different varieties of peptic ulcer. The x ray is an invaluable adjunct in the diagnosis.

These statements may not appear to the examining physician as possessing value, not because they are not clear, but because they contain nothing tangible to guide him in making a diagnosis. And that is just where the difficulty lies; there are no fixed lines to guide in the diagnosis and differential diagnosis of peptic ulcer. Moynihan, in his monograph on duodenal ulcer, asserts that chronic hyperacidity is an indication of duodenal ulcer, but that is only in un-

complicated and early cases. The more chronic cases cannot be detected in this way. "We know now," says Eggleston, "that a number of abdominal disturbances reflexly disturb the function of the stomach and its chemistry and cause symptoms that closely simulate those of duodenal ulcer. For this reason a diagnosis of peptic ulcer should not be made without exceedingly painstaking study. Not only should a careful history be taken and a thorough physical examination made, but, in addition, the patient should have the benefit of laboratory study and, whenever possible, a thorough x ray examination of the gastrointestinal tract. Even then a small percentage of unavoidable errors will result."

SYMPTOMATOLOGY.

The symptomatology of duodenal ulcer is analogous to that of gastric ulcer. But in gastric ulcer, as distinguished from the duodenal, the pain occurs earlier in the course of digestion, and is intensified by a full meal, especially where coarse foods or those difficult of digestion are partaken.

Mayo Robson believes that any one or all of the cardinal symptoms of gastric ulcer may be wanting. He says that he has frequently operated for gastric ulcer where pain was not a conspicuous symptom, where hematemesis had been entirely absent, and vomiting had not come on until stenosis of the pylorus had produced dilatation.

The pain is usually referred to the epigastrium, whence it may radiate in various directions though, as a rule, it is toward the left subscapular region. Food usually increases the intensity of the pain, and the time of its onset, after the ingestion of food, is frequently indicative of the site of the ulcer. If the ulcer is in the location of the cardia or along the lesser curvature, pain is evidenced shortly after the taking of food, or within a half hour. If the ulcer is at or near the pylorus, the pain is experienced one, two or even three hours after food is taken, whereas the pain is usually, although not necessarily, later in appearing in the duodenal ulcer, and is usually relieved by taking food.

Robson also calls attention to the fact that as digestion is frequently delayed in the evening, pain of this character usually awakens the patient around

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the hour of midnight; a circumstance that is quite common in gallstones, when many of the other symptoms are absent. He also emphasizes the fact that epigastric pain is usually well marked with rigidity of the recti and may be strictly localized or widely diffused, a specially tender spot often being found in the dorsal region, a little to the left of the spine, opposite the ninth and tenth dorsal vertebrae.

Late in the course of gastric ulcer complications may arise, which include perforations; adhesions; contractures; dilatation of the stomach due to obstruction; and fistulae between the stomach and pylorus with adjoining organs or on the surface of the body; local peritonitis, ending in adhesions, suppuration and a localized abscess; abscess of the liver, pancreas or spleen; pressure on or stricture of the bile ducts producing jaundice. There is a type of ulcer to which the name penetrating is employed in contradistinction to perforating, and in this connection Eggleston remarks (3):

"More than ten per cent. of our gastric ulcers were found to be what we have chosen to designate as penetrating ulcer, using this term in contradistinction to chronic perforating ulcer. A penetrating ulcer is one that has burrowed through the posterior stomach wall into the neighboring organs or tissues, usually the liver or spleen. In a sense it is a perforating ulcer, but is so surrounded by adhesions as to prevent the serious consequences which, in perforating ulcer, follow the escape of stomach and duodenal contents into the abdominal cavity. The penetrating ulcer is distinguished clinically, by greater severity of pain, greater local tenderness and the absence of relief after the ingestion of food and alkalies, as is found in the typical simple ulcer. It would seem that the active peristalsis set up following the ingestion of food is as largely responsible for the pain as is the increased acidity."

Perforation of a gastric ulcer is a matter of gravest importance. The force of this statement is apparent when it is recalled that ninety-five per cent. of cases result fatally unless treated surgically at once. In acute perforation, the stomach contents are emptied into the peritoneal cavity; in subacute, the stomach is empty, the ulcerous opening is small, and the opening becomes partly or wholly occluded by a layer of plastic lymph. Medical treatment is sometimes efficacious in the subacute variety. The acute and subacute perforations in gastric ulcer are most common upon the anterior wall. The chronic form of gastric perforation is more likely to occur through the posterior wall, in which perforation occurs into the peritoneum, protected by adhesions due to a previous inflammation.

The prognosis in perforating ulcer depends upon the interval between the time of perforation and of operation, upon the size and character of perforation, and whether the stomach is full or empty. In 1910, Moynihan reported twenty-four operations for perforation, sixteen from ulcer of the stomach and eight from ulcers of the duodenum, with fifteen recoveries, showing a mortality of 37.5 per cent.

Hemorrhage, as a rule, is not fatal, but its occurrence mentally depresses the patient. The amount of hemorrhage offers no idea of the size of the blood-vessel eroded. Where a solitary ulcer exists hemor-

rhage is rarely fatal. Large hemorrhages frequently repeated at short intervals offer a grave prognosis. Parenthetically, it should be remarked that, in addition to gastroenterostomy, the ulcer should be resected, cauterized or infolded with an infolding of the peritoneum. With the march of modern surgery, the dangers of secondary anemia are obviated through the intervention of transfusion. Formerly this anemia was the bane of the surgeon because of the impossibility of meeting the secondary condition by means of forced feeding.

Although ulcers occur far more frequently upon the posterior wall, perforations are far more common upon the anterior. And again, although more than eighty per cent. of all cases of perforation of gastric ulcer occur in females, especially around the age of twenty-five, nevertheless, the number of perforations is relatively more frequent in men, especially above the age of forty (Mayo Robson).

The chronicity of the ulcer is a subject of much interest and importance and Gruber asserts that in at least seventy-five per cent. of cases of chronic duodenal ulcer, the patients never consult a physician (4). Their cases are never diagnosed and they refer to their condition as chronic dyspepsia. Eggleston (5) believes that the relief obtained from the large number of proprietary remedies commended by victims of ulcer, is largely due to the alkalies contained in them, especially the bicarbonate of soda, which temporarily alleviates the pain in these cases. He asserts that probably thirty per cent. of these persons suffer from peptic ulcer. This affection yields probably more completely than any other organic condition to therapeutic measures. In the cases reported, eighty-five per cent. of the patients under medical treatment are regarded as cured. These so-called cures last from days to months, during which time there is absence of gastric pain, indigestion, and occult blood. The recurrence of the symptoms is interpreted as the formation of a new ulcer rather than a relapse of the former one. The x rays have exposed this fallacy, showing that months or even years may elapse without complete healing.

There are cases included under this head which are extremely difficult of diagnosis and offer so peculiar a symptomatology that their true nature is often overlooked. These ulcers are of the pyloric, duodenal or gastric type and seem to give little clue, except for their perforating tendencies. The subject has been most elaborately studied by Graham (6) of the Mayo Clinic, and some of his valuable deductions are incorporated in the statements which follow.

Often the only symptom complained of in ulcer is the sudden, acute, short attacks of epigastric pain, rarely radiating in character, but which may radiate to the back if posterior perforation is impending. Recovery from the pain is usually sudden and complete, so that without resort to the rays, apparently the most rational, though erroneous, diagnosis is gallstones. Vague symptoms may point to the liver, while the gastric disturbance predominates. Where-as the symptoms manifested, that is, pain, gas and vomiting, are usually indicative of the true condition, in a great number of cases the pain bears no

relation to the ingestion of food, in fact, it is quite independent of food, is not caused or relieved by it, and the gas intensifies the distress.

In another class of cases there are mild digestive disturbances, often quite disregarded by both physician and patient. There is slight distention from gas, slight regurgitation, or vomiting.

The other class of cases is that of chronic gall-bladder disease, with adhesions, duct obstruction, contraction, perforation and perhaps pancreatitis. When any of these conditions are present, the symptomatology is quite analogous to that of chronic gastric ulcer with perforation.

A diagnosis of ulcer is favored if the symptoms first assert themselves when the patient is from fifteen to thirty years of age. Occurring later in life, the presence of gallstones is more likely. When the attacks of pain follow such other at short intervals and are repeated from day to day, even when acute, the diagnosis is to be guarded. It is much oftener ulcer with perforation than gallstones.

With the occurrence of acute pain, night after night, and with constant distress and general gastric disturbance, the probable diagnosis is ulcer, unless hectic symptoms should supervene. Even in a patient past the age of thirty-five or forty, who has these symptoms, in the absence of fever, chills, sweats and jaundice, the probable diagnosis is ulcer.

Pain that comes on immediately after taking food and is unrelieved by an alkali also brings into consideration the subjects of appendicitis and cholecystitis. In the presence of the symptoms of irregular food distress, or pain, anorexia, gas and vomiting, the likelihood of appendicitis should not be forgotten.

The clinical picture presented by peptic ulcer is anything but a uniform one, and the not infrequent peculiar symptoms presented allow of wide and varying interpretation. With so much confusion likely to arise in the minds of the best clinicians, it becomes the paramount duty of every conscientious physician and surgeon to resort to the x rays as a constant routine in the study of this important class of cases, the rays being of the utmost importance in the differential diagnosis of peptic ulcer.

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218 SOUTH FIFTEENTH STREET.

Acute Perforation of Gastric and Duodenal Ulcer*

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Acute perforation of an ulcer of the stomach or duodenum is not an everyday occurrence, nevertheless it is frequent enough to demand our serious attention. This is especially true because it is a curable condition and its cure depends upon its early recognition. In 59,450 autopsies Bassler (1) found ulcer of the stomach or duodenum in four and four tenths per cent. Of these, five per cent. were perforated. In 543 consecutive operations for ulcer of the duodenum or stomach, Mayo (2) found twenty-seven perforations. Davis (3) gives still higher figures, asserting that twenty per cent. of all duodenal and seven per cent. of all gastric ulcers perforate. Musser (4) found twenty-eight and one tenth per cent. of perforations in 1,800 cases. Gibson (5) believes that next to appendicitis and intestinal obstruction, perforation is one of the most frequent acute abdominal conditions.

Why and when do ulcers of the stomach or duodenum perforate? When we consider the thinness of the walls of these viscera, it is readily seen how easy it is for an already existing ulcer to perforate, whenever there is a tendency to grow rather than to heal. And as long as the conditions which are responsible for the ulcer in the first place continue, that tendency is present. In fact, it is strange that these ulcers do not come to perforation more fre-

quently. As to the immediate cause of the actual perforation, the most common is overloading of the stomach, causing undue stretching. Next to this is trauma that causes a pull or a blow on the weakened wall. Thus we see perforation occurring frequently after a hearty meal or while the patient is engaged in some strenuous work or exercise.

In our series, one case of perforation occurred after eating, one while the patient was working on the farm, one while the patient was working as a carpenter, and one during vomiting caused by the original ulcer. In the fifth case, however, perforation occurred while the patient was in bed, early in the morning, with the stomach empty. A study of the literature shows that such occurrences are not uncommon. In other words, an ulcer of the stomach or duodenum may perforate at any time.

The age of patients with perforation varies considerably. In Hertz's series (6) of sixty cases, it varied from sixteen to seventy-five; in Wise's series (7) from twenty-six to fifty-seven; in Gibson's cases (5) the average age was thirty-five. In our series, the ages were fifty-three, seventy, sixty, fifty-seven and twenty-three.

It is much more common in men than in women; forty-three out of sixty, eight out of nine, fourteen out of fourteen, are the proportion of men in different series reported. Our cases were all in men.

The proportion of gastric to duodenal ulcers

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varies greatly in different reports. Farr (8) reports more gastric than duodenal perforations in twenty-four cases; Hertz reports forty-seven gastric and thirteen duodenal cases; Petré (9) sixty-five gastric and twenty-seven duodenal cases, while Struthers (10) reports only eighteen gastric as against seventy-two duodenal cases; Wise (7) four gastric and five duodenal cases; Gibson (5) seven gastric and seven duodenal cases. In our five cases, all were duodenal perforations.

The existence of other ulcers beside the one that has perforated must be kept in mind. Petré (9) reported several ulcers present in twenty-seven per cent. of his cases. It is for this reason that gastro-enterostomy is urged by many in every case. Perforation of more than one ulcer at the same time is rare. Eliot (11) has collected twenty-six such cases of multiple perforation from all the literature.

The diagnosis of perforation is not made by observing a large number of symptoms or signs, but the few symptoms that are present are so striking and definite that a diagnosis in the beginning is not difficult. The two principal symptoms are pain and rigidity, the former evident to the patient, the latter to the examining physician.

The pain, like that of the rupture of any hollow viscus, is characterized by its suddenness of onset and its excruciating character. It is so severe that the patient at once drops any activity in which he is engaged and holds himself in a strained immovable position, fearful of increasing the pain by any movement. In one of our cases the patient was standing in a stooped position and it was impossible to get him to lie down in order to be examined. It is continuous, which differentiates it from the colicky pains of intestinal obstruction or acute indigestion. The pain at first is epigastric in its location, a little to the right of the centre if duodenal, central or nearly so if gastric. Soon the pain travels down the right side toward the right iliac fossa in the case of duodenal ulcer and that is why many of these cases are diagnosed as appendicitis. In fact, after peritonitis has developed, especially if there is not a clear history of the onset, it is almost impossible to make a diagnosis. In the case of a gastric ulcer away from the pylorus, leakage occurs down the left side of the abdomen and the pain is there rather than on the right side.

The second symptom and that which is most evident to the examining physician, is rigidity. The abdomen is as hard as a board and often scaphoid in shape and the rigidity is a little more marked in the epigastric region at the beginning, a little later along the right side, but soon becomes general.

These two symptoms, the sudden excruciating pain in the epigastrium and the boardlike rigidity of the abdomen, are almost sufficient to make the diagnosis of perforation of a gastric or duodenal ulcer.

Usually there is a history of indigestion preceding the perforation due to the presence of the ulcer that perforated. When this history is obtained, it greatly helps in confirming the diagnosis, but if it is absent, it does not necessarily exclude perforation, as this indigestion is not always present before perforation. Muller and Ravdin (17) report fifteen cases of perforated gastric ulcer, in four of

which perforation was the first sign of abdominal pathology. Hammond (18) reports fourteen cases with no history of dyspepsia. In our series, indigestion had been present in every case.

Another symptom that is usually present is vomiting. It is not, however, a striking symptom, usually occurring only a few times and in some cases absent altogether, especially in the first hours, before peritonitis has developed. In two of our cases there was no vomiting whatever.

Dullness in the flank is a valuable symptom, but this occurs only when sufficient stomach contents have leaked into the abdomen. It is found mostly in the right flank, especially in duodenal perforations, and disappears when the patient lies on his left side. The longer the perforation exists the more marked it becomes, but, of course, should never be waited for. Its presence is confirmatory, but its absence does not exclude perforation.

As to absence of liver dullness, that is a symptom always mentioned in the textbooks, but as a matter of fact it seldom exists, except in a large perforation in late cases. It certainly is an exceptional and unreliable symptom. Gibson says he did not find it in his series of fourteen cases and we did not find it in any of our own cases.

The absence of any elevation of temperature or increase of pulse during the first hours is an important point to remember, as it is likely to deceive the physician into thinking that the condition is not a serious one. The temperature and pulse in our own cases, when first seen, was as follows: Temperature 98°, pulse 60, four hours after perforation; temperature 98°, pulse 76, one hour after; and temperature 98° by rectum and pulse 76, three hours after; temperature 99°, pulse 76, about five hours after; temperature 98°, pulse 64, four hours after; temperature 98°, pulse 96, seven hours after perforation.

A blood count was done in only one of our cases before operation, in which case there was a leucocytosis of 15,000 with ninety per cent. polynuclears. The high percentage of polynuclears in an acute abdomen would indicate a serious condition requiring operation, as first shown by Sondern (12) and Gibson (13) and verified by a study which I made in 1908.

To recapitulate, the cardinal symptoms of perforation of gastric or duodenal ulcer are sudden excruciating pain in the epigastrium accompanied by boardlike rigidity of the abdominal wall, usually preceded by a period of indigestion.

The conditions from which acute perforation must be differentiated are acute indigestion, appendicitis, cholecystitis, pancreatitis, and intestinal obstruction. The pain of acute indigestion usually comes on suddenly, commonly in the middle of the night, is often epigastric, and generally accompanied by vomiting. But it is intermittent in character, and although the abdomen is held rigidly during the pains, in the intervals it relaxes and becomes soft.

Most commonly perforation is confused with appendicitis, and to do so is a serious mistake, for it means an incision in the lower part of the abdomen, and then, if the diagnosis is made, a second one in the upper part. In the beginning, the differential diagnosis is easy, for the pain of appendicitis, even

though often beginning in the epigastrium, is lower, the tenderness and rigidity are in the right iliac fossa, and the temperature and pulse are increased. Later, however, especially in a duodenal perforation, when the leakage has reached the right iliac fossa, it becomes much more difficult, and after a general peritonitis has been established, it is impossible to differentiate the two conditions, unless there is a very clear history of its onset.

I remember two cases of general peritonitis, seen very late with both patients in *extremis* and without a clear history, where it was impossible to determine the cause of the peritonitis. On account of the much greater frequency of appendicitis, incision and drainage were made in the lower right side, but in each case the appendix was not sufficiently diseased to account for the peritonitis. It is possible that in one or both of these cases there was a perforation, but as autopsy was absolutely refused, the cause was not found. All this emphasizes the importance of making an early diagnosis. The physician who first sees the case has the greatest responsibility, and, if he makes the diagnosis, deserves just as much credit for saving the patient's life as the surgeon who operates.

Fortunately the other conditions with which perforation may be confused usually also require early operation through a high incision, so that no great harm is done if the exact diagnosis is not made before operation. In severe or gangrenous cholecystitis, the pain is further to the right and the rigidity is more circumscribed. Acute pancreatitis may simulate perforation very closely, of the duodenum, if in the head, and of the stomach, if in the body or tail. On opening the abdomen, the diagnosis can usually be made, the fluid contents in the case of the pancreatitis being dark colored and small areas of fat necrosis usually being present in the omentum. Perforation sometimes markedly resembles intestinal obstruction and in one of our cases this diagnosis was first made, but corrected before operation.

The treatment of perforation is exclusively surgical and without it the mortality is practically one hundred per cent. We can imagine that a piece of omentum or a plug of fibrin might become lodged over the opening, thus closing the perforation and curing the patient for the time being. Shoemaker reports such a case, in which the patient was operated upon six days after the perforation. But this is so rare that it should be absolutely disregarded in considering the treatment of these cases. Or the perforation may become adherent to the liver, as in one of our cases, with subsequent leakage and peritonitis.

The operative treatment consists in opening the abdomen through an upper right rectus incision and closing the perforation. As most of the perforations are on the anterior surface of the first portion of the duodenum or pyloric portion of the stomach, these parts should be inspected first. I have found that the best and quickest way to find these parts is to follow the gallbladder to its neck, which lies next to the first portion of the duodenum. If the perforation is not found here, then the lesser curvature, and finally the greater curvature should be examined.

The gap is best closed by a pursestring or a row of interrupted sutures, and buried by a second purse-

string or second row of Lembert sutures using linen or chromic catgut, bringing as much healthy peritoneal surface together as possible without causing obstruction. This is sometimes difficult in large or indurated ulcers. The omentum may then be sewed over the wound, often by sewing the lesser to the greater omentum. Where it is impossible to sew the edges of the gap together, an adjacent viscus or a piece of omentum may be sewed over the opening, and it has even been suggested to tampon or place a catheter directly into the opening and surround it with omentum, thus forming a temporary fistula.

There are three steps often taken in the operative treatment concerning which there is considerable disagreement. They are excision of the ulcer, gastroenterostomy, and drainage.

As to excision of the perforating ulcer, that is advised because it is supposed to remove the ulcer entirely and thus avoid any danger of secondary perforation. As a matter of fact, in those cases in which secondary operations or autopsies were done some time after simple suture, the ulcers were found to be perfectly healed, while secondary perforation was usually due to another coexisting ulcer and not to the original one. Consequently it seems like poor judgment to subject the patient to the added risk of an excision for a very doubtful benefit.

Gastroenterostomy after closure of the perforation is strongly advocated by many surgeons, to overcome the supposed obstruction caused by infolding of the edges of the perforation and to bring on a cure of the original or any coexistent ulcer, thus preventing secondary perforation or hemorrhage. Deaver (15) does a gastroenterostomy in every case. Richter (16) asserts that if the perforation is properly closed it must cause an obstruction. On the other hand, Gibson (5) shows that results after gastroenterostomy are not so good as without it and that actual obstruction very rarely occurs. Eliot (11) has made some experiments on cats, showing that when portions of duodenum were excised up to two thirds of the circumference, and the duodenum then sewed up, no obstruction developed, the stomach did not become dilated, and the narrowed portion of the duodenum later became dilated. When we consider that perforation is a desperate condition causing any prolongation of the operation to be of most serious consequence; that gastroenterostomy is a procedure of considerable magnitude; that it must be done in an infected field; that in itself it is prone to later complications, such as jejunal ulcer, we are forced to the conclusion that the patient's chances of recovery are much better without a gastroenterostomy. The only exception to this rule would be those cases where the obstruction is obviously too great to allow the gases and fluid chyme to pass through. Furthermore, if the patient continues to suffer from symptoms of ulcer, a secondary gastroenterostomy can be done later with much more safety. In this way we operate for a desperate condition in two stages, just as we have learned to do in other desperate conditions, reducing our death-rate considerably. In none of our cases was a gastroenterostomy done and we had no cause to regret the omission.

The question of drainage cannot be answered yes

or no, but must be decided in each individual case. In a study of the literature, however, one is struck by the growing tendency not to drain in most cases. The stomach and duodenal contents are sterile and the peritonitis at first is a chemical one rather than infectious. Where there are gross stomach contents in the abdomen or there is a well advanced peritonitis, drainage is advisable, sometimes through a stab wound in the lower part of the abdomen. In all other cases, however, patients make a very satisfactory recovery without drainage. Two of our cases were drained and two were not.

What is the prognosis of perforation of the stomach or duodenum? This cannot be determined with any degree of accuracy, as undoubtedly many cases are not recognized. But of the cases diagnosed and operated in, a sufficiently large number have been reported to give a fair idea of the prognosis. A study of these cases forces one to the conclusion that a favorable prognosis is determined more by early diagnosis and operation than by any other factor, even including the skill of the surgeon and the method of operation used. Thus Hertz (6), in a series of nineteen cases operated in six hours or less after perforation, had seventy-five per cent. of recoveries; in a series of twelve cases operated in between six and twelve hours after perforation he had sixty-six per cent. of recoveries; and in a series of twenty-two cases operated in more than twelve hours after perforation, there were only twenty per cent. of recoveries. In the series of fourteen cases operated in by Gibson (5), the only fatal case had perforated thirty-six hours before operation. In our own series, the four patients operated upon were fortunately seen early and operated upon between five and twelve hours after perforation. All of them recovered.

In all cases of sudden and acute pain in the abdomen, the possibility of a perforation of a gastric or duodenal ulcer should be carefully considered. If a diagnosis of this condition is made, operation should be done with the least possible delay. In the beginning and with proper treatment, acute perforation has a small mortality. When operation is delayed or omitted, perforation is a most serious and tragic condition.

RÉSUMÉ OF OUR OWN SERIES OF FIVE CASES.

All these cases were preceded by a period of indigestion and all were in men. In one case operation was refused. The patient was a man seventy years of age, who had just recovered from a prostatectomy done several months before and was a very poor risk on account of his age and its attendant complications. Perhaps we did not urge operation sufficiently. At any rate, the family was opposed to any further surgical intervention and he died twenty-two hours after perforation. The diagnosis was verified by autopsy, showing large perforated ulcer of the duodenum partly adherent to the under surface of the liver.

In the other four cases the first patient was operated upon by Dr. William Mansperger, the rest by me. The diagnosis was made in each case, though not without fear and trembling. Nevertheless, we were sufficiently convinced to make a high right rectus incision in each case. Operation was done,

respectively, ten hours, four hours, twelve hours and six hours after perforation. Two of the cases were drained and two were not. None of the ulcers were excised and gastroenterostomy was not done in any case. The size of the perforations was from one eighth to one quarter of an inch in diameter. The average stay in the hospital was twenty days.

All four patients have been traced. The first one, operated upon in 1913, was entirely relieved of pain, and worked as a carpenter until 1919, when his abdomen became distended with fluid. He came in from the country to be tapped, after which he was quite well again and worked almost to the day of his death one year later. His death was said to have been due to myocarditis from which he had suffered for years. The fluid in his abdomen apparently had no relation to the former ulcer. The remaining three patients are all alive and well today. One, operated upon in 1917, is working as a carpenter every day. His only complaint is an occasional slight pressure in the epigastrium.

The next patient, operated upon in 1918, is working a large farm today and says he never felt better in his life. The last patient was operated upon in June and in a letter dated August 29, 1921, writes: "I have never felt better in my life. Nothing I eat bothers me."

In no series of cases do we feel so positive that surgery has saved lives that otherwise would surely have been lost as in these case of acute perforation of gastric or duodenal ulcer.

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1196 MAIN STREET.

The Problems and the Progress of Gastric Ulcer Surgery

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The problems of ulcer of the stomach and duodenum are at the moment most disturbing. The details and, indeed, the very basis of etiology are unsettled. But new light is being shed on the subject by a multitude of workers and the difficulties of the topic have been pressed back to the discovery of ways of decreasing the number of failures in operative treatment and to the lowering of mortality to the last degree; for we have passed many of the milestones on the way to the ideal management of the disease.

A. Kocher has suggested that the statistics of some of the large European clinics, where radical measures are required for the cure of ulcer, must be studied with the fact in mind that malnutrition is general because the populace, even today, is fed inadequately and in unaccustomed ways. He intimates that where the dietary is thus limited, gastroenterostomy may not suffice for cure and that the various types of resection or excision may be needed. A writer (1) discusses the reasons for the increased frequency of gastric disease since the war and gives an extended bibliography of the subject.

H. J. Paterson, of London, regards the discharge of the alkaline jejunal juices into the stomach as the important favorable factor in ulcer healing after gastroenterostomy. Jarno and Vandersky (2) state that during the fasting stage of the stomach's life, waves of reversed peristaltic action carry into the stomach duodenal contents.

There is a school of workers in gastric surgery who consider that the influences of nerve action are important in the production and maintenance of ulcers. W. Braun, of Berlin (3), says: "I have tried in recent times with such patients (that is, in those cases where there existed no distinct indication for a positive procedure) the simple transection of adhesions by the complete isolation of the pyloric part of the stomach and duodenum from its vessels and nerves in the hope of better combatting the phenomena of irritation." Although his work is too recent for full estimation, Braun is encouraged, by the condition of his patients thus far, to consider that neural influences are of great importance in gastric ulcer.

H. J. Paterson's study of the operative treatment of ulceration leads him to make the following assertions: First, occlusion of the pylorus is an unnecessary complication of gastrojejunostomy and is based on erroneous pathology. Secondly, if gastrojejunostomy is a physiological operation, then it is as efficient a treatment for ulcers of the body of the stomach as for ulcers near the pylorus; in other words, gastrojejunostomy is preferable to excision.

Brütt, of the Hamburg clinic (4), concludes a careful study of a great series of cases as follows:

1. As well in the fixing of indications for operative intervention in general as in the choice of the method is not only the momentary operative success to be considered, but also, in the first line, the remote result after the operation.

2. In callous ulcer remote from the pylorus, even when it occurs with penetration, operation is indicated, in general even if the patient finds himself in an interval free from complaint. The so-called successes with internal treatment in this form of ulcer are only transitory, in the best case the ulcer is carried over for a time in a state of latency.

3. The method of choice in callous ulcers remote from the pylorus is for us resection, best in the form of so-called transverse resection; with good technic and careful choice of cases the operative mortality is not much higher than in gastroenterostomy (according to our experience five per cent. mortality in transverse section against four per cent. in gastroenterostomy), yet the permanent results are essentially better. A number of the gastroenterostomized cases [in pylorus] of remote and penetrating ulcer end fatally sooner or later. Billroth's second method and its modifications show a considerably higher operative mortality than transverse resection. They are only to be brought into application when the transverse resection is impossible, where considerable difference exists in the width of the gastric stumps after resection. Moreover, transverse section produces relations which go far toward simulating normal gastric relations.

In ulcer near the pylorus and in cicatricial pyloric stenosis we cling fast to gastroenterostomy as the normal procedure, under some conditions, in connection with pyloric closure. But the low mortality is offset by later complications.

Considerable opposition to simple transverse resection has developed during recent years partly on account of the mortality which is usually too high to weigh properly against the comparatively minor disabilities and dangers of gastric ulcer. Bier states that he has not been very fortunate with direct resection. He seems to prefer the second Billroth method but he describes and beautifully illustrates both methods in his book (5).

The place of gastroenterostomy in the treatment of ulcers has undergone marked changes during recent years. In the earlier years of its employment it was thought that its beneficent effects would extend to almost all ulcer cases. Today the heads of large and active clinics, though they differ in their statistics of cure and palliation, are agreed that the formation of the opening results in cure in a large number of cases, the remainder being only improved, some symptoms of ulcer persisting.

It is well worth noting that Wilensky and Crohn (6), who studied a small series of cases in which the patients had been operated upon for stomach diseases, considered that gastroenterostomy left the stomach definitely impaired in a large percentage of the cases. They think that if the organ is able to adjust itself to partial occlusion of its outlet where the stenosis comes about slowly, the making of a gastroenterostomy is then in place because an outlet for the stomach contents is provided. But, under the reverse conditions, far more harm than

good is likely to result from making the opening. They strongly warn against the operation when stenosis is absent.

In America a modification of operative procedure employed to meet this difficulty has been that of local excision of the ulcer or cauterization of its base. The surgeons of the Mayo clinic have set the example.

Among thoughtful German surgeons, however, local excision has not met with so much favor as has the idea of the resection of the stomach wall, including the ulcer. But the technical difficulties are frequently great, chiefly because of the adhesive invasion of the neighboring structures, pancreas, colon, and other organs. The separation of adhesions and the obliteration of fistulae are frequently both difficult and hazardous.

These difficulties can be overcome by great technical skill. Von Haberer has just reported a series of nearly a hundred gastric resections without a death and with satisfactory functional results. He uses the first Billroth method.

Kocher (7) has recently presented us with very timely, sensible and wise deductions from a large experience and much ripe thinking. The diagnosis of gastric ulcer in his clinic has reached remarkable precision. In eighty-six per cent. of his cases active ulcer was found at operation; in fourteen per cent. of the cases error was made only as to the ulcers that were healed with scars and adhesions persisting. In only two per cent. of the cases was entire absence of ulcer and scars noted.

The diagnosis between simple and callous ulcer can be made with great probability, but not with certainty. That method of treatment is most effective which brings about conditions which permanently act against the formation of ulcer.

From a consideration of the actual permanent results obtained by him with gastroenterostomy, Kocher presents seventy-eight and one seventh per cent. as very good; nine and one ninth per cent. of the cases gave good and in but seven and one fourth per cent. was the result of that operation unsatisfactory. So he thinks that in the greatest number of cases not only does healing occur but new ulcers are prevented from forming. He considers that a correctly applied and properly functioning gastroenterostomy remains permanently. The failures after this operation, he says, are due to the leaving of incorrect anatomical or functional conditions.

At the opposite pole of surgical therapy is the Vienna Breslau School. The treatment of ulcer of the stomach and of the duodenum by the application of the first Billroth method is recommended by Von Haberer, as already noted, for the most extended application. This operation consists in excision of the pylorus and part of the stomach, followed by direct suture, the redundant part of the gastric wound being sufficiently diminished by suture at the side nearest the lesser curvature to provide conditions necessary for approximation.

Von Haberer considers it important to excise the pylorus and regards the reestablishment of gastric structure by the original Billroth plan as corresponding most closely with physiological requirements. Although this brilliant surgeon emphasizes the fact that his results may have to be viewed in

another light after some years have passed, yet the results are indeed alluring at present. At the moment of making his last report he had operated on eighty cases without a death. The results as to function have been most gratifying. The stomach soon adapts itself to its new relations and there seems to be no trouble with ulcer recurrences.

The operation demands great technical skill on the part of the surgeon, far more than simple gastroenterostomy. Von Haberer's successful experience makes his technical remarks worthy of study, especially when he describes the first Billroth operation.

To the longitudinal incision he adds, where necessary, transverse cuts into or across the recti muscles. The abdomen opened, orientation is made, preferably without evisceration of the transverse colon. He considers postoperative pneumonias more likely to result from exposure and chilling of the viscera than from the anesthesia. The orientation is likely to be difficult on account of the adhesions and the penetration of the ulcerative process into the neighboring viscera. The transverse mesocolon is then incised to give access to the posterior wall of the stomach. Next the vessels of the lesser curvature are tied with great care and then those of the greater curvature. The pylorus may be freed in the same way. The hepatoduodenal region is also sutured, while the small bloodvessels about the duodenum are carefully tied. Von Haberer recommends leaving intact, as far as possible, the trunks of the upper and lower pancreaticoduodenal arteries. Furthermore, the serosa upon the posterior wall of the duodenum is to be spared, if possible, from all traumatism. Then comes mobilization of the duodenum which, practised according to the method of Kocher, does much to simplify the remainder of the intervention and to provide adequate mobilization which is important.

Next under clamp protection the condemned part of the stomach is removed and the cardia and duodenum are approximated together. Then follows mucous membrane suture, the seromuscular layer and finally the serosa. As previously stated the inequality of the duodenum and the stomach mass must be made good.

Eiselsberg discusses with masterly brevity and clearness the problems we are considering. He says: "The question which stands today at the focus of the operative treatment of gastric and duodenal ulcer is this: what kind of intervention appears indicated . . . simple gastroenterostomy, unilateral pyloric exclusion or, finally, resection? It is known that, in the course of years, many surgeons have given up gastroenterostomy and have replaced it by a more radical procedure. Recurrence of hemorrhage, above all the arising of that evil spirit of gastroenterostomy, peptic ulcer of the jejunum, to which, as is well known, attention was called at the congress more than two decades ago by H. Braum, have led to this."

He states that gastroenterostomy gives, in a considerable number of the cases, a satisfactory result; the prognosis being more favorable when obstruction exists at the pylorus and that the ulcers lying at a distance from the pylorus, though not anatomically influenced, can become clinically latent without

losing their complicating dangers. Attention is to be called to the not unessential danger of a gastroenterostomy in cases presenting insufficient objective findings, since the conditions brought about by it lead with relative frequency, to peptic ulcer of the jejunum.

Pyloric exclusion, originated by Eiselsberg, the blocking of the pylorus as a passageway from the stomach to the duodenum with the simultaneous formation of a gastroenterostomy, promptly corrects the hemorrhages from ulcer. But it has the great disadvantage that ulcers more frequently recur than after simple gastroenterostomy. This is probably due to the pouring of acid juice into the bowel. So Eiselsberg, following the suggestion of his former pupil, Von Haberer, has decided for the present to reconsider the application of this procedure to the treatment of ulcer. But he hopes that modifications of gastroenterostomy will restore its usefulness. For example, the principle of longitudinal gastric reefing may be advantageous in that it diminishes the secretory power of the glands near the outlet of the stomach.

Transverse resection of the stomach for ulcer, he says, gives most satisfactory immediate results and the mortality is low in the hands of skilled surgeons, but in sixty-four cases of Eiselsberg, ulcer recurred nine times, and four of these patients had to be operated upon a second time.

Therefore Eiselsberg practised transverse excision of the ulcer bearing area with gastroenterostomy. This is Billroth's second method; but since Von Haberer has so successfully used Billroth's first method, Eiselsberg has substituted it. The first method of Billroth consists of excising, with reunion by directly suturing the duodenum into the lower portion of the wound in the stomach. He confirms Von Haberer's preliminary reports of successful results with low mortality.

Extensive excision of the acid producing portion of the stomach is regarded as important by many surgeons. Substitutes for this procedure have been presented in the extensive reefing or infolding of the organ already mentioned and in the section of the gastric wall down to the mucosa all about the ulcer bearing area with the purpose of diminishing the glandular activity.

Doegé (9), of Wisconsin, writes intelligently on the choice of operative measures in gastric ulcer and decides in favor of pylorotomy with posterior gastroenterostomy. He boldly states that the cure of chronic gastric ulcer by gastroenterostomy alone is doubtful since that operation gives its best results in ulcers near the pylorus accompanied by stenosis. But in ulcers distant from the pylorus it gives only temporary benefit. He states that pylorotomy fulfills what he considers the principal requirement for the cure of gastric ulcer, i. e., the "removal of acidity," better than any other operation.

On the other side of the question is the very recent paper of Métraux, inspired by Roux (10) of Lausanne. Métraux recognizes that the tendency of most surgeons is towards direct attack upon the ulcer. Furthermore at a recent meeting of the French Congress of Surgeons, the conclusions of Duval in favor of Balfour's method of directly clearing out and sewing together the edges of the

ulcer and of annular resection were accepted by a number of surgeons for whom extensive pylorogastroectomy constitutes the method of choice. Emphasizing the incontestible gravity of this operation in comparison with a benignant gastroenterostomy, Roux and Métraux consider that there is danger in thus allowing the field of the extensive interventions to enlarge. The study of the remote results to their patients causes them to conclude that simple gastroenterostomy should still be considered as meeting many indications.

Theoretically correct for simple pyloric obstruction is pyloroplasty by the Heinecke-Mikulicz method, consisting of longitudinal incision through the pylorus followed by suturing the wound in the same direction, but satisfactory functional results are not attained. Finney's operation, essentially plastic, is also unsatisfactory for a physiological outcome and seems to have no field of usefulness.

The rather extensive resection of the pylorus and the gastric antrum results well in practice. Of course no obstruction is left at the outlet of the stomach, and the removal of a part of the secreting structure of the organ must profoundly modify its function. The German savants have laid special stress upon the importance of nerve and blood supply and the resection of the outlet of the stomach and the antrum certainly accomplishes this purpose. Of course the evaluation of the changes produced belongs to the future.

The function of the resected stomach seems to be improved with surprising promptitude. The removal of the ulcer bearing part of the organ must be of great importance in the improvement of all relations.

It is generally admitted that gastroenterostomy improves the conditions under which healing may occur, but that it has no direct curative effect. Hence after this operation the care of the patient must still be the profound concern of the surgeon. The following case is an example:

CASE I.—Mrs. R., aged sixty years, five feet three inches in height, who had had gastric ulcer for many years may be considered. Entering the hospital at a weight of less than a hundred pounds, she had a cholecystectomy done together with a posterior gastroenterostomy. Her appetite returned at once and as soon as food could be taken in good quantity the weight began to increase rapidly. In ten weeks she weighed a hundred and twenty-eight pounds and was in excellent condition.

But when a barium buttermilk meal is given, although the fluid leaves the stomach at once and actively by the new opening as well as by the pylorus, the organ contains about a fourth of the meal at the end of six hours. The ptosis of the stomach was much improved and digestion is only rarely associated with the formation of gas. Evidently this woman needs medical treatment and management for a long time in order to ward off active recurrence of the ulcer symptoms. It seems probable that the condition will improve with time; the tonicity of the stomach should be largely regained. Ochsner is especially insistent with respect to the aftercare of gastroenterostomized patients. They should be under supervision for months if not for years.

No one can now lay down hard and fast rules on which the surgeon shall base his surgical practice in these cases. But considering that many American patients can have the benefit of selected food and good nursing and in many cases they submit to surgical intervention before operation has become a last resort, we may offer the following suggestions for guidance in steering a middle course between extremes:

1. Intelligent patients should be told that secondary operations must sometimes be done in order to give them the best chances for recovery under the application of the least radical modes of intervention.

2. Gastroenterostomy has its recognized place in ulcers near the pylorus with symptoms of obstruction, especially if the patient is well cared for afterwards.

3. Partial pylorogastrectomy after the first Billroth method should have place in callous ulcers, in ulcers remote from the pylorus, in multiple ulcers and in cases complicated by perforation and the penetration of the neighboring organs, if feasible.

4. In the great number of ulcer cases not falling within these classes, gastroenterostomy should be regarded as properly satisfying the surgical indications, although it is to be admitted that failure to

secure full relief may be followed by the necessity for more radical subsequent intervention, i. e. extensive resection by the first Billroth method.

5. If such rather generous and conservative suggestions as to the indications are pursued, the surgeon of moderate technical ability will not find himself pressed to perform operations beyond his powers. And in the minority of cases where little benefit has accrued to the patient, the more extended operation may be performed under chosen and favoring conditions.

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31 NORTH STATE STREET.

Recognition and Treatment of Minor Ailments of the Digestive System*

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The minor digestive disturbances frequently met with can be divided into those of an acute type and those assuming a chronic character. Acute catarrh of the stomach, duodenum, gallbladder, liver, intestine, and colon represent the first group. The diagnosis is usually easy; the symptoms are pronounced and definite.

Thus, in acute gastritis there is anorexia, retching and sometimes vomiting. A feeling of fullness and tenderness to pressure over the region of the stomach are encountered. Acute duodenal catarrh manifests some sensitiveness in the right upper abdominal area and is frequently accompanied by jaundice.

In acute cholecystitis there is tenderness in the region of the liver and beneath it. The liver is usually slightly swollen, and there may be slight embarrassment in breathing deeply. Acute hepatitis will show similar symptoms, but the enlargement of the organ will be more definite and the tenderness over it more pronounced.

Acute enteritis will be accompanied by crampy sensations all over the abdomen, slight nausea, frequent diarrhea, and again tenderness to pressure in the lower abdomen.

Acute colitis reveals tenderness over the large bowel, cramps, constipation and difficult bowel move-

ments with mucus alone and sometimes mixed with blood.

In all these affections a rise of temperature is usually present. As a rule the degree of fever corresponds to the severity of the process of disease.

Acute appendicitis (catarrhal) reveals tenderness to pressure over McBurney's point. The patient experiences pain in the right iliac region. In the severer forms there are present an exudate in the right iliac area, spasm or rigidity of the right abdominal muscles, and usually symptoms of infection (fever, nausea, vomiting and abdominal colic).

The treatment of most of these affections is comparatively simple and easy. The two principles of greatest importance are rest of the affected organ and following Nature's indicated paths, or, in other words not interfering with symptoms unless they become a danger in themselves. Many of the symptoms accompanying a disease are regulatory mechanisms serving to reestablish health. Thus, in acute indigestion, there is anorexia and sometimes vomiting. The first symptom serves to keep food away from the stomach and to establish the desired rest, the latter symptom (vomiting) to rid the afflicted organ of undesirable and abnormal material. To interfere with these wise arrangements would be wrong.

If, however, the vomiting persists over too long a period and there is danger to life from inanition,

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measures against it have to be undertaken. We should deal similarly with other symptoms, such as fever, diarrhea, and constipation. Do not interfere too much, but step in when a symptom, by its great severity or persistence, begins to become dangerous to life.

The chronic minor ailments of the digestive tract are usually functional disturbances, such as hyperchlorhydria, subacidity, nervous dyspepsia, nervous regurgitation, nervous eructations, anorexia, sitophobia, and habitual constipation.

In making a diagnosis of functional disease of the digestive tract it is always essential to exclude an organic lesion as the basis of the disease. This is often easy, but at times is difficult or impossible.

With regard to the type of disease the following rules generally obtain:

1. Conditions going along for a long time with a train of symptoms not changing in character nor in gravity belong to functional disturbances.

2. Ailments showing changes in the subjective symptoms but persisting for a long period of time without materially deteriorating the objective state of the organism are generally neuroses.

3. Diseases lasting a few months, steadily progressing in severity, and generally changing the looks of the individual from a healthy to a sickly appearance, are usually of an organic type and often malignant.

4. Digestive disturbances persisting for some time, alternating with free intervals, and reappearing in a steadily severer form, with perhaps shorter intervals of euphoria and longer periods of disease, are often due to a benign organic lesion.

The functional disturbances can be discovered either by the symptoms present or by a direct examination of the function in question. Thus: In hyperchlorhydria, there are pains late after meals; in subacidity the dislike of meats. The neuroses are generally recognized by their subjective symptoms and apparent lack of an organic lesion. A great many neuroses develop after slight inflammatory processes, persisting as a result of habit; thus ructus nervosus, regurgitation, rumination, and sitophobia.

TREATMENT

Functional disturbances, as well as digestive neuroses, never endanger life, except by faulty management and insufficient nutrition.

The main treatment of functional and neurotic disturbances of digestion consists in instituting a hygienic way of living and correcting any abnormal states discoverable in distant organs, inasmuch as most of these disturbances are due to an improper way of living, such as too fast eating, too many condiments, alcohol, tobacco, too great mental strain or anxiety, physical overexertion; or the opposite status, such as too slow eating, and lack of occupation, or to reflex states from distant abnormal organs, such as eyestrain due to astigmatism, appendicitis, gallbladder lesions and uterine disorders.

The correct way of living includes also a proper amount of food, not too much, nor too little. Great deviations in either direction are occasionally the cause of existing digestive and other severe ailments.

Work without too much fatigue, with sufficient periods of rest and sleep, the ingestion of simple

foods in moderate quantities, and freedom from mental strain, are the main principles in the management of these chronic sufferers.

As regards the quantity and quality of foods the patients should partake of common foods in the ordinary amounts customary at the family table and should weigh themselves once a week or so, in order to see whether they keep their balance. Very coarse and highly seasoned substances, also too many courses at one meal, should usually be avoided.

The special variety of functional disturbance may require additional points of dietary and medicinal treatments, but these are usually subordinate to the general principles outlined above.

In hyperchlorhydria frequent eating, an abundance of butter, eggs, milk, vegetables and a small amount of meat: avoidance of spices and acids are required. In the way of medication alkalies, such as sodium bicarbonatic, magnesium, kaolin, neutralon, bismuth and calcium are beneficial.

In subacidity and achylia an egg milk diet with fine cereals and mashed vegetables and soups with some spices will at first be given. Later on fish and chicken and other kinds of tender meat can be added. As a medicament hydrochloric acid can be administered for short periods of time, while stomachics, such as nux vomica, gentian, condurango, quassia and cinchona can be administered for longer periods of time.

The habit neuroses require systematic suppression of the faulty habit. Ructus or aerophagia must be combated by the patient's avoidance of belching whenever feasible, even should he feel uncomfortable. Regurgitation of the food must be suppressed by the patient, but if the food has reached his mouth, he should swallow it.

As an illustration of the importance of the right management of this condition the following case may be briefly described:

A boy of nine was brought to me complaining of vomiting for the last two years. The ailment affected him to such an extent that he lost considerably in weight, was kept back in his growth and felt weak and sickly all the time. While in my office the boy brought up a mouthful of food. His mother then said that this was the way he vomited, namely, mouthfuls at a time. A diagnosis of regurgitation could, in this way, be easily made. The loss in weight was ascribed to the failure of the food to remain in the digestive tract, which led to a state of inanition. The treatment consisted of making patient partake of a liberal diet and insisting upon him swallowing the food when it came back to his mouth. The mother was instructed to keep close watch on the boy and to see to it that this rule was strictly adhered to. He soon began to increase in weight and in a short time regained his health completely.

Rumination is mastered by the intentional suppression by the patient of the coming up of the food, and not masticating again, but simply swallowing what has reached his mouth. Any dietary régime in these cases is of no advantage and rather hurtful. Nerve sedatives are of benefit.

20 EAST SIXTY-THIRD STREET.

A New Technic for the Preparation of *Bacillus Acidophilus* Milk and Its Therapeutic Value

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Escherich observed in 1886, while investigating the fecal flora of infants, the predominance of great numbers of gram positive rods. He did not attach any particular importance to these organisms and it remained for Moro in 1900 to isolate and demonstrate these gram positive rods to be a distinct type of intestinal organism which he named *Bacillus acidophilus*. Tissier in 1900 isolated *Bacillus bifidus*, an organism apparently related to the *acidophilus*. *Bacillus bifidus* appears to be the dominant organism in the fecal flora of breast fed infants. As the child grows older and the artificial feeding is made to include a higher percentage of protein substances, the *Bacillus bifidus* is replaced by the *Bacillus acidophilus*. As the child approaches adolescence and the diet is made to include a higher percentage of proteins, there is a proportionate decrease of the aciduric types and the intestinal flora becomes more complex in character.

The *Bacillus acidophilus* is the protective organism of the intestinal tract. If a sufficient amount of a suitable pabulum is present in the digestive residue they are capable of suppressing the activity of the harmful types of intestinal bacteria. That is, they suppress the proteolytic activity of the putrefactive, the saccharolytic activity of the fermentative and the infective activity of the pyogenic bacteria. Lactose, because of its slow assimilation, passes to the lower ileum and colon when taken in sufficient amounts and is the food upon which the acidophile types thrive best (1). Maltose and dextrine have a similar action upon the aciduric types.

Bacillus bulgaricus bears a microscopic resemblance to *Bacillus acidophilus*, but culturally, they differ (2). *Bacillus acidophilus* is an organism separate and distinct from *Bacillus bulgaricus*. *Bacillus acidophilus* is a normal inhabitant of the intestinal tract. *Bacillus bulgaricus* is essentially a milk parasite and cannot be acclimated to the intestinal tract. In young patients *Bacillus acidophilus* can be made to dominate the intestinal flora by adding lactose to the diet, thus proving its existence in the feces. Rettger and others have shown that lactose also aids the growth of *Bacillus acidophilus* in the intestines of experimental animals.

If the intestinal flora has a definite biological significance in relation to health and if the maintenance of this biological interrelationship is related to diet, then the study of these interrelationships must necessarily begin in early childhood, when the metabolic processes are harmonized and the diet approximates more nearly the normal than at any other time in life. During this period the intestinal flora is quite simple in character and is dominated by the aciduric types. It is at this period of life that the majority of children are free from foci of infection

and naturally the metabolic processes are in the ascendancy and the whole biological unit is passing through an actively constructive phase.

The diet, during this early period, consists chiefly of vegetable substances, fruits, grains and milk. There appears to be a relationship between the aciduric flora, the lactovegetarian diet and the constructive metabolic phases of the child. However, proportionately as the diet increases to include proteins, there is a corresponding reduction, not alone of the percentage of acidophile domination, but also of the constructive metabolic rate. It would appear that, biologically, it was intended that we subsist chiefly on a lactovegetarian diet that would stimulate the proliferation of the friendly acidophile types, which in turn prevent or inhibit the putrefactive, fermentative or pyogenic types from gaining lodgement in the lower digestive tract. The lower digestive tract furnishes a vast and fertile field for the invasion of pyogenic bacteria and for harboring the putrefactive and fermentative types.

As a rule, the suppression of the acidophile types, with a domination of the putrefactive and pyogenic types, causes, first, simple putrefaction of the fecal contents, which is followed by a stasis of the colon. The integrity of the mucosa of the colon is broken and there occurs a rapid absorption of the products of putrefaction and in time, the invasion of the mucosa, lymph nodes, and the mesenteric lymph system by the pyogenic types. From these locations, bacteria and bacterial products find their way into the blood stream or are drained to the spleen and liver, resulting finally in splenic induration and biliary fibrosis (3). The stasis of the colon necessarily predicates a stasis of the entire intestinal tract and in this way the physiological function of the digestive tract is disorganized. It is to be remembered that intestinal infection is associated, in almost every instance, with infections in the upper digestive or respiratory tracts.

Chronic diseases of indefinite origin are frequently associated with an intestinal flora of the pyogenic or putrefactive type. While a complex fecal flora may be present in apparently normal and healthy individuals, it does not signify that this apparent state of health is predicated upon the complex nature of this flora, but rather that the health picture is not as sound as it appears and that the well being of the individual is being menaced consistently by this type of flora. If such cases were followed, it would be found that in time this complex flora undermines the defenses and constitutional resistiveness of the host, predisposes to other infections, and finally a frank expression of their activity is manifested by crippled functions and damaged structures of the body.

PREPARATION OF *BACILLUS ACIDOPHILUS* MILK.

When preparing a therapeutic substance for oral administration, it is well to consider the comfort of the patient. *Bacillus acidophilus* must be given in large doses to produce results. The average culture media upon which it is grown has many disadvantages, chiefly in producing nausea or hyperacidity, or excessive flatulency. The media of choice would be one pleasing to the senses of sight, smell and taste, and in addition must be one upon which the acidophilus will yield a high bacterial count.

Rettger's technic.—After much experimentation, Rettger succeeded in training the acidophilus to coagulate milk (4). *Bacillus acidophilus* is not a milk parasite but a normal inhabitant of the intestinal tract. Since *Bacillus acidophilus* is not at home in a milk medium, the first requirement is that the milk should be sterile, for if other organisms are present, their growth will exceed the development of the acidophilus and the milk will be worthless and often harmful. Fresh skimmed cows' milk, in litre quantities, requires thirty minutes autoclaving under sixteen pounds' pressure to become sterile. It is cooled and inoculated under strict laboratory technic and incubated for twenty-four hours at 99° F. A curd is formed during this process, and there is a slight separation of the curd from the whey. The preparation is then ready for use. We have noted that if the milk is not sufficiently autoclaved many coccoid forms appear associated with the bacilli and we believe these forms to be of a nature of transmutation of the bacilli. We have been able to eliminate the coccoid forms by simply growing the culture containing them on a well autoclaved milk for several successive generations and the smear will show only viable gram positive bacilli. The milk prepared by Rettger's technic is brownish in color, creamy in consistency, aromatic in odor and slightly acid in taste. We have had excellent results with milk prepared according to this method, but some patients objected to the taste, color and consistency.

A new technic.—After experimenting for some time we have been able to produce a milk that is white in color, of a nonlumpy consistency, with practically no odor and in which we can regulate the fat content to suit the requirements of the patient. The milk can also be made with an acid or slightly sweetish taste. This can be done without altering the bacterial count. We prepare the white acidophilus milk in the following way: One pint of tap water is placed in a litre flask. If one wishes a sweet tasting milk, a heaping tablespoonful of lactose is added to the water, which is then autoclaved for twenty minutes under twenty-five pounds pressure. The water is cooled and a pound tin of unsweetened, evaporated milk is added to the flask, observing sterility. The mixture is inoculated with ten c.c. of a stock culture of *Bacillus acidophilus* under aseptic technic, shaken and incubated for twenty-four hours at 99° F. The curd formed will be soft, white and slightly separated from the whey at the top. Shake the flask to break the curd, refrigerate, and the milk is ready for use. The acidity of the milk is controlled by the incubation period—the longer it incubates the more acid

it becomes. The fat content may also be regulated by varying the amount of water or milk.

If either of these methods is followed it is possible to produce acidophilus milk in pure culture. We have experimented with boiled milk, evaporated milk and boiled water, and condensed milk and boiled water, and while a satisfactory milk may be produced for a time, there is the ever present possibility of contamination. Under our instructions patients have tried to produce the milk at home, but contamination and lack of proper incubation facilities have been active deterrents to successful results. The milk should be as uniform as possible day after day in dosage, bacterial count, consistency, odor, taste, viability and purity of culture. The success of acidophilus therapy is dependent upon the observance of a number of minute details which may appear as unnecessary or unessential to one unacquainted with intestinal bacteriology.

Drug manufacturers have sought a way to dispense *Bacillus acidophilus* in capsule, tablet or liquid form with doses of three to five millions of viable bacteria. The physician, unmindful of the vast amount of bacterial life operative in the intestinal tract, is led to believe that millions constitute massive dosage. That is not the case, however, for when one speaks of intestinal bacteria, one deals with trillions. It is possible to simplify the intestinal flora with minute doses of acidophilus if one prescribes six to ten ounces of milk sugar a day with these bacteria. We have tried this with success. In many instances, however, the patient objects to taking the milk sugar. Tablets and capsules are makeshifts which appeal to the patient's idea of convenience and to the credulity of those who are unmindful of the vast amount of intestinal bacterial activity. The liquid culture of the *Bacillus acidophilus*, used in sufficient doses and fortified with lactose, is as effective as the milk, but is not so palatable. There are some patients who refuse to or cannot take milk for various reasons. In these cases we use a lactose whey culture which is a satisfactory medium and one which gives a tremendous growth in twenty-four hours. The whey is made as follows:

PREPARATION OF WHEY FOR *BACILLUS ACIDOPHILUS*.

Boil the milk slowly for twenty minutes. Let it stand for thirty minutes or until a pellicle forms on the surface of the milk. Remove the pellicle and gently boil, add one gram of sodium citrate to each litre of milk. Let it stand for thirty minutes, then boil two minutes. Add slowly twenty c.c. of a twenty per cent. hydrochloric acid solution to each litre of milk. This coagulates the fats. Let stand for forty-five minutes, then remove the fats by filtering through a towel or fine gauze. Bring the fat extracted milk to a gentle boil. Neutralize with twenty per cent. sodium hydrate, titrating with litmus paper. Filter through a double layer of filter paper. After filtering dilute the pure whey three times. Take about five hundred c.c. of the diluted whey and dissolve in it ten grams of peptone, five grams of salt, ten grams of gelatine, and one hundred grams of lactose for each

litre of diluted whey. Filter this whey with the nutrients into the diluted whey and autoclave in litre quantities for thirty minutes at five pounds' pressure. After the whey has entirely cooled, inoculate with a twenty-four hour culture of *Bacillus acidophilus*. Incubate for at least twenty-four hours.

It is highly probable that *Bacillus acidophilus* milk will never be a commercial success, because the preparation of the milk must follow an exacting technic to which no one will contribute assiduously unless directly interested in its administration. It is hoped that *Bacillus acidophilus* will escape the commercial exploitation to which Metchnikoff's bulgaricus was subjected.

Bacillus acidophilus is not a cureall. It will perform but one therapeutic function, namely, to assist in the reestablishment of the normal biological action of the intestines and colon, if certain other circumstances are favorable and make possible or assist in the performance of this one function.

The performance of the biological function of *Bacillus acidophilus* in the digestive tract is predicated upon (4):

First.—The removal of foci of infection from the upper digestive tract (teeth, tonsils, sinuses, gallbladder) and the respiratory tract. Of course, venereal and genitourinary infections must also be attended to. A complete *deinfection*¹ should be accomplished concomitantly, not simply the removal of one foci, an interval of waiting for results, and if none, the search for another foci and so on.

Second.—In many instances upon the efficient nonsurgical mechanical drainage of the colon. This process drains the colon, an infected area, and also renders mobile a colon partially immobilized dynamically, and, also by adhesions (3-5).

Third.—Sufficient doses of pure cultures of viable strains of *Bacillus acidophilus* recently isolated from a healthy intestinal tract.

Fourth.—The maintenance of *Bacillus acidophilus* domination by diet.

By the observance of these four factors it is possible to simplify rapidly the complex nature of the fecal flora of man in three to five days and to maintain this simplification after there has been a sufficient change of the biological processes in the intestinal tract to permit of the acidophile domination in association with the proper dietary measures (3). It is evident that the suppression of the acidophile types allows the putrefactive and pyogenic types to become entrenched in the crypts of the intestinal mucosa, and in many instances in the lymph nodes and the mesenteric lymph system, and effect a more or less permanent residence, so that their dislodgment is not necessarily accomplished by a simplification of the intestinal flora over a few days. It frequently requires months of simplification of the fecal flora to change the biochemical environment, so that it is inimical to the growth of the putrefactive and pyogenic forms, not alone in the intestinal canal, but also in the intestinal tissues.

One should not expect *Bacillus acidophilus* to accomplish but one thing, namely, the simplification of the intestinal flora, and this can be accomplished successfully only by a removal of foci of infection from the upper digestive and respiratory tracts, and by the adherence to a proper diet.

The part that foci of infection play in the production of disease has been so ably demonstrated by so many different investigators and by so many different technics that is useless to present any argument for it. Volumes have been written on the subject and it is an approximation of cause and effect in medicine which has taken so long to be brought about. Little attention has been given to the intestinal tract and less has been known of the favorable or unfavorable influence that the intestinal flora plays in the maintenance of good health. Clinically, intestinal infection produces, or is associated with, a multitude of disorders and diseases. The more common types of diseases associated with infections of the digestive tract are: cardiovascular renal conditions; rheumatism; arterial disease; essential high blood pressure; some forms of skin diseases; some forms of asthma; neurasthenic and psychasthenic states; neuritis; some forms of neuralgia; malnutritional states; some forms of obesity; diabetes; chronic constipation; autointoxication syndromes; subacute or chronic appendicitis; certain ocular conditions; protracted convalescent states; either from acute diseases or operations, or pregnancies; chronic cholecystitis; hemorrhoids; syndromes characteristic of visceroposis; mucous colitis and various indefinite digestive disorders (6-3).

Bacillus acidophilus milk constitutes a means of giving enormous acidophilus doses in a palatable form. It constitutes a food product as well as a therapeutic beverage. It is given in quart quantities, daily, until the differential bacterial count of the fecal smears show a sixty-five or seventy per cent. dominance of *Bacillus acidophilus*, and then the dose is regulated thereafter by the percentage of domination maintained by diet. It is essentially a biological measure with many advantages and few disadvantages, and if used under proper conditions will do one thing, namely, suppress the activity of the putrefactive and pyogenic types. It is a biological intestinal antiseptic and it appears to promote not only the physiological function of the intestinal tract but also to aid materially in constitutionally benefitting the individual.

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166 WEST SEVENTY-SECOND STREET.

265 WEST SEVENTY-SECOND STREET.

¹ This word is perhaps more inclusive than the word disinfection.

Radiological Diagnosis of Primary Carcinoma of the Ascending Colon with Metastasis to the Jejunum*

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CASE.—A. P., female, aged fifty-two, widow, referred for radiological examination on October 19, 1921. Her father died at the age of sixty-one from cancer of the esophagus and her mother died at sixty from kidney disease. Two brothers were dead, cause unknown, and two sisters were alive and well. In childhood she had had measles and typhus fever at the age of twenty-two. Since that time the patient had suffered from colitis for six years. From the age of twenty-eight, however, up to the time of this report the patient had been in good health. Her surgical history was negative. Menstruation began at the age of fourteen, menopause at forty-eight. She was married at twenty, had had no children, but two miscarriages.

Eight weeks before this report was made the patient began to complain of pain in the right lower abdomen, and a diagnosis of appendicitis was made. The patient was treated medically and remained in bed for three days and apparently recovered from what was supposed to be an attack. Two weeks later she began to notice a swelling of the abdomen, but with no symptoms of distress or discomfort. Her appetite was good. Bowels were slightly constipated. There was no loss of weight or strength complained of. The swelling of the abdomen had been the same for the last two weeks, but prior to that time it was growing larger from its first appearance, four weeks previously.

Physical examination showed head, neck, chest, cardiovascular system, genitourinary organs, skin, bones and joints all negative. She was well developed and well nourished. The entire abdomen was swollen, but there was no tenderness on pressure and no rigidity. On palpation of the abdomen no abnormal masses could be felt. The fluid wave was distinctly present. The clinical diagnosis was: 1. Tuberculous peritonitis. 2. Ovarian cyst. 3. Hypertrophic cirrhosis. An examination of the blood and urine was negative.

A radiological and radioscopical examination of the gastrointestinal tract showed the stomach to be sausage-shaped, and situated high in the left hypochondriac region. The shape of the stomach and the elongation of the duodenum were probably due to compression from the fluid in the peritoneal cavity. There was no evidence of defect in the greater or lesser curvatures of the stomach or of the pylorus.

An examination after six hours showed no residue in the stomach. The small intestines in the upper part of the jejunum and the ileum showed numerous areas of constriction, with tremendous dilatation of the small intestines. The lower portion of the ileum showed a marked dilatation, indicating obstruction at the ileocecal valve.

There was distinct obstruction in the jejunum with the characteristic vertical arrangement of the coils of the small intestine and gas bubbles. Canalization beyond the area of obstruction was also seen.

An examination after twenty-four hours showed a distinct spasticity of the ascending colon.

An examination by barium enema showed the entire large intestine well and fairly evenly filled with the barium enema. There is, however, a slight dilatation of the colon above the area of constriction of the ascending colon. The filling defect in the ascending colon was fairly persistent and marked, and visualized after the emptying of the barium enema.

The pathological findings suggest: 1. The stomach is negative for new growth or ulcer, and is likely in a state of neurosis due to compression. 2. Obstruction of the small bowel, probably the jejunum, with multiple adhesions causing marked distention of the bowel. Dilatation of the lower portion of the ileum near the ileocecal valve, indicating obstruction in that region. 3. Filling defect of the cecum and ascending colon, which, while persistent, cannot be definitely attributed to malignant new growth.

In my opinion the patient is suffering from a malignant new growth causing obstruction of the small intestine. The reason for not developing



FIG. 1.—Examination after six hours showing dilatation of the jejunum with the characteristic vertical arrangement of the coils; also canalization.

*Read before the Yorkville Medical Society, New York City, January 16, 1922.

symptoms of obstruction, with characteristic clinical manifestations of the same, is due to the fact that in spite of the obstruction and distention of the small bowel, there is canalization formed through which the contents of the small intestines empty them-

cecal valve. The lower end of the jejunum was infiltrated with a similar mass causing almost complete obstruction. The liver was covered with a new growth of similar character. A section of the omentum was removed for pathological study.



FIG. 2.—Examination after twenty-four hours showing distinct spasticity of the ascending colon and defect.



FIG. 3.—Barium enema; same persistent defect after evacuation of the bowels.

selves. The patient was admitted to the St. Marks Hospital on October 21, 1921, and was operated upon the next day. The operation was performed by Dr. Benjamin T. Tilton.

Operation.—A median line incision below the

The postoperative surgical diagnosis was malignant neoplasm in the ascending colon with metastasis to the jejunum, omentum and liver. The pathological report was hyperplasia of alveoli filled with irregular, cylindrical epithelial cells—adenocar-

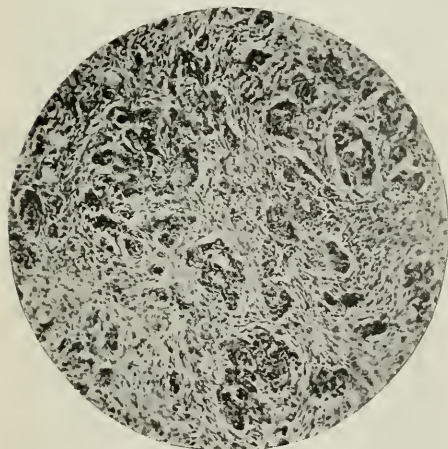


FIG. 4.—Section from one of the metastatic glands of the omentum showing adenocarcinoma.



FIG. 5.—Section from one of the metastatic glands of the omentum showing adenocarcinoma.

umbilicus was made. About five quarts of clear straw colored fluid was found free in the peritoneal cavity. The omentum was covered with hard gray colored masses varying in size. The ascending colon had a large mass about three inches above the ileo-

cinoma. On the seventh day after the operation, November 1, 1921, the patient was up and about, her appetite was good, and her general condition was much improved. On November 3, 1921, the patient was discharged.

In submitting the radiological report to the surgeon the radiologist considered the history, as well as the clinical findings in this case. In spite of the absence of typical signs and symptoms of malignancy, such as ulceration and pus discharge from the rectum, hemorrhage, cachexia and signs of intestinal obstruction, the radiologist was still obliged to adhere to the clinical opinion of malignancy. Later the radiological findings corroborated the clinical findings. It is difficult to ascertain by radiography malignancy of the large or small intestine, unless a definite palpable mass is found in the abdomen, or signs of obstruction appear. Then the case becomes a classical one of malignancy, with all the typical signs.

Carman, of the Mayo Clinic, in *Röntgen Diagnosis of Diseases of the Alimentary Canal*, says: "Practically the sole abnormality of the jejunum and upper ileum showing definite röntgenological signs is obstruction. When the obstruction is pronounced the

signs are quite decisive. New growths, more commonly carcinomas and adhesions from inflammatory processes, are the usual cause of stenosis. Unless a tumor mass can be palpated the nature of the obstructing lesion can hardly be predicted, nor can its exact seat usually be determined."

In this case as well as in many others, it is evident that the radiologist should be a good clinician primarily and somewhat of a pathologist. He should be given the privilege of taking a careful history and making a physical examination of the patient referred to him for radiological diagnosis, and as far as it is practicable the radiologist should be given the opportunity to follow his cases in the same manner as the surgeon and the internist, so that he may develop into a better diagnostician. The day is near when the radiologist will cease to be a mere "picture man," and will demand a place at the consultation table with his colleagues.

182 LEXINGTON AVENUE.

Chronic Colitis in Neuropsychiatric Cases*

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In the plan of treatment for disabled ex-service men, several hospitals were set aside for observation and treatment of persons whose chief disability was a psychoneurotic one. The first of such hospitals to be opened was the institution known as United States Public Service Hospital No. 37, which is located at Waukesha, Wis. Patients are sent here only upon recommendation of neuropsychiatrists after careful examination or after a period of observation in another hospital. Most of the patients have been examined many times prior to admission.

The purpose of this paper is primarily to emphasize the importance of chronic colitis in this hospital. A statistical review from a diagnostic viewpoint of a series of consecutive admissions may be of interest to demonstrate its relative frequency and also to give a general idea of the type of cases treated.

The series under consideration consists of 156 consecutive admissions to my service, between the dates of June 1, 1920, and June 1, 1921. Table I gives a classification of the 156 admissions according to diagnosis. The final diagnosis was made only after a long period of observation, and was concurred in by the entire staff of the hospital before whom the patient was presented for review prior to discharge. In a few cases the diagnosis has not as yet been finally confirmed, because the patients are not yet ready for discharge or for other reasons. The diagnosis given is that of the most outstanding condition from the viewpoint of industrial and social efficiency. Many cases did not present the picture of a single neuropsychiatric condition,

but were borderline cases with admixtures of two or more conditions. In a large number of cases there were certain organic factors which as a rule were not in themselves disabling except as they increased the psychoneurotic reactions.

In studying the diagnosis in Table I, two points stand out prominently; first, that in only fifty-four per cent. of the admissions can the final diagnosis be classed among the psychoneuroses; secondly, that twenty-six per cent. of the cases are purely organic.

Chronic colitis is important because it is of frequent occurrence, and especially because it is often entirely overlooked. In this series there are twenty-two cases of chronic colitis. In six of them the colitis was the most prominent condition, and in four others it was an aggravating factor of greater or lesser significance to other organic conditions. In only twelve cases was the primary diagnosis a psychoneurosis. Of these, seven were diagnosed neurasthenia, three hysteria, one anxiety neurosis, and one psychasthenia. A statistical study of this group of cases with the results of treatment is set forth in Table II.

In the foregoing twenty-two cases, five had no neurotic or psychoneurotic symptoms. Of the remaining seventeen the psychiatric condition was slightly improved in four, greatly improved in twelve, and arrested in one as a result of treatment.

The important symptoms of chronic colitis may be placed in two main groups. First, those symptoms referable to the chronically inflamed colon itself, such as dyspepsia, abdominal distention, tenderness, abdominal pain, intestinal cramps, diarrhea, and passage of mucus; secondly, those symptoms due to toxicity, such as headache, vague muscular

*Approved for publication by the Surgeon General of the United States Health Service.

and neuritic pains, backache, fatigability, fainting spells and weakness. One is less likely to err in the diagnosis if the symptoms in the first group are stressed by the patient. Frequently, however, they

TABLE I—CLASSIFICATION BY DIAGNOSIS.

<i>Psychoneuroses</i>	
Hysteria	47
Neurasthenia	26
Anxiety neurosis	9
Psychasthenia	2
Total	84— 54 per cent.
<i>Borderline Conditions</i>	
Constitutional psychopathic inferiority	8
Constitutional psychopathic state	1
Hypochondriasis	1
Cyclothymia	2
Total	14— 9 per cent.
<i>Psychoses</i>	
Dementia praecox	5
Manic depressive psychosis	2
General paresis	2
Total	9— 6 per cent.
<i>Organic neurological conditions</i>	
Epidemic encephalitis	3
Epilepsy (idiopathic)	2
Epilepsy (traumatic)	2
Brain injury with hemianopsia	1
Organic brain disease	1
Cerebrospinal syphilis	1
Cerebellar tumor	1
Total	11— 7 per cent.
<i>Other organic conditions</i>	
Hyperthyroidism	8
Chronic colitis	6
Chronic nephritis	5
Chronic pulmonary tuberculosis	5
Organic heart disease	4
Diabetes	1
Chronic arthritis	1
Total	30— 19 per cent.
<i>Miscellaneous</i>	
Mental deficiency	4
Neurocirculatory asthenia	3
Chronic alcoholism	1
Total	8— 5 per cent.
Grand total	156—100 per cent.

TABLE II—RESULT OF TREATMENT OF COLITIS

Diagnosis	No. of cases	Unimproved	Slightly improved	Greatly improved	Arrested
Chronic colitis with no or minor neurotic symptoms	6	0	1	5	0
Primary psychoneurosis with chronic colitis as an aggravating factor	12	0	2	3	8
Hyperthyroidism with chronic colitis as an aggravating factor	3	0	0	0	3
Pulmonary tuberculosis with chronic colitis as an aggravating factor	1	0	0	0	1
Total	22	0	3	8	12

are not, while those in the second group are emphasized.

Chronic colitis cases are often considered psychoneurotic for the following reasons. First, for some unaccountable reason, the average physician knows much more about gastric ulcer, cardiospasm, or pancreatitis than he does about chronic colitis, yet the latter is vastly more important from the point of view of frequency and morbidity. We find none of the former conditions in our series while we find twenty-two of the latter. Secondly, the diagnosis is often mistaken because many of the symptoms are vague and do not point at once to their origin. Thirdly, the patient often does not realize that there is anything wrong with his intestinal tract, and so does not call the physician's attention to it.

If a physician, and especially a neuropsychiatrist, cannot quickly find a probable organic cause for

these rather vague symptoms, he is likely to call the condition a gastric or intestinal neurosis, or simply neurasthenia. Often he lets the patient go on his way with some platitudes, begging for a diagnosis. Too often he tells him that his trouble is in his head, which only adds to his worry and helps to precipitate a neurosis. These patients make the rounds of doctors, being diagnosed and treated differently by each, but with no improvement, until they have lost faith in all physicians and, which is more important, in themselves. Being really sick and finding no relief, they become a prey to patent medicines, chiropractors, and other charlatans. These also failing, they become hypochondriac, irritable and moody. So it not infrequently happens that a patient who perhaps originally had only this organic condition, acquires also a neurosis or a psychoneurosis. This makes the diagnosis still more difficult, for then the physician is even more likely to overlook the organic condition when the functional is so prominent. It is no wonder chronic colitis cases are notorious for their neurotic and psychoneurotic manifestations.

Following the most markedly neurotic cases through, has demonstrated over and over again that what they needed most was to be properly understood and correctly diagnosed. When this was done, their intestinal condition explained to them, and their cooperation gained, in dietary treatment, immediately a marked improvement occurred in their nervous symptoms. This improvement has usually continued as the colitis symptoms have been relieved until the patient regains his normal mental level. Occasionally, however, if the colitis is of long standing, there is likely to be a recurrence. This is well illustrated in the following case.

CASE I.—C. C. M., ex-sergeant, aged thirty-five, complained of being "nervous, shaky and jumpy" at times. He also complained of headaches, dizziness, dyspepsia, heartburn, vomiting, occasional constipation, insomnia, restlessness, fainting spells, and emotional depression with crying spells. He said there was a band of soreness about his body at the level of the costal margin. He had been treated in many hospitals for about two years wrongly diagnosed. Upon examination marked tenderness was found over the whole course of the colon, which could be distinctly palpated and was spastically contracted. His stools were small, hard, and coated with mucus, and defecation was accompanied by cramping and tenesmus. Following laxatives he would have several watery movements with large amounts of mucus. He gave a history of similar complaints at various times for the last fifteen years. His condition was much aggravated by the army diet, but especially by the army compound cathartic pills which were frequently prescribed for him. Rational dietotherapy and physiotherapy led to considerable improvement in his intestinal and toxic symptoms. The grave psychoneurosis which had developed, chiefly because his organic condition had never been understood and properly dealt with, was only partly relieved. He left the hospital at his own urgent request to return to his home in Montana with a diagnosis of "neurasthenia with hysterical admixtures and with organic factors. The principal organic factor is a long standing chronic colitis."

Some months later he wrote that his bowel condition had again become serious, so that our work with this case was largely a failure. If the first physicians he consulted had been fortunate enough to detect and properly treat his colitis, it is certain that his psychoneurosis would never have reached the stage it has.

The second case illustrates well the importance of the toxic symptoms, and also the frequency of mistaking the colitis for appendicitis and cholecystitis. Probably most cases diagnosed appendicitis where a normal appendix is found on operation, are cases of either acute or chronic colitis.

CASE II.—F. J. G. admitted complaining of severe, persistent pains in ankles and in calves of legs, and to a lesser extent in thighs, shoulders and back. He also complained that he tired easily and was nervous and irritable. This condition had been present for two years. He gave a history of appendectomy and cholecystectomy within the last six months, and the extraction of several teeth. Before admission he had been examined by several internists and neurologists with the diagnosis of neurasthenia. Examinations by orthopedists were negative. Upon abdominal examination, persistent tenderness over the colon was found, but only after careful questioning was a history of alternating constipation and diarrhea obtained. During diarrhetic attacks, there were intestinal cramping, increased

abdominal pain and tenderness, and marked accentuation of his toxic symptoms. Dietetic treatment resulted in marked improvement of both local and toxic symptoms, and the patient was discharged to take up vocational training with a staff diagnosis of "chronic colitis with secondary neurotic and neuritic manifestations." Letters from this patient state that he still has some pain in his legs occasionally, but his vocational training is progressing well.

SUMMARY.

1. Of 156 consecutive admissions to the service of the writer in the first Public Health Service Hospital for Psychoneurotics, a primary diagnosis of psychoneurosis was made in only fifty-four per cent. of the cases.

2. In this series the primary diagnosis of an organic condition was made in twenty-six per cent. of the cases.

3. Chronic colitis was found as the chief disabling condition in six cases, and as an organic factor of greater or less importance in sixteen other cases.

4. Chronic colitis is very often overlooked by physicians and neuropsychiatrists with dire results for the welfare of the patients.

Grateful acknowledgment is made to Dr. Lawrence Kolb, medical officer in charge, for his constant encouragement, and to Dr. Thomas J. Heldt, clinical director, for suggestions.

The Importance of Röntgen Ray Localization of the Intestinal Tube

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For purposes of determining the presence of the intestinal tube beyond the stomach, in the duodenum or the jejunum, the method ordinarily most relied upon is the aspiration of duodenal or intestinal fluid. This method can be accepted as proof in the large majority of cases, but it is far from being infallible and cannot be accepted as a sure criterion.

Not only may a regurgitation of duodenal fluid occur into the stomach, but in addition the end of the tube, although still in the stomach, may be sufficiently near the pyloric sphincter that by means of the syringe sufficient suction may be produced to deliver fluid from the duodenum. This possibility is indicated in Fig. 1. In this case, although duodenal fluid was obtained, a röntgenogram of the rubber tube demonstrated that the end had not advanced into the duodenum.

Where exact localization of the end of the rubber tube is important, a röntgenogram is essential. Such localization is impossible from a determination of the length of tubing swallowed. The tube may be coiled in some part of its course (Fig. 2). Moreover, owing to the variations in the size of the esophagus, stomach and duodenum in different individuals, there is a corresponding variation in the length of tubing necessary to reach any definite part of the intestine. Thus Figs. 3 and 4 are röntgenograms of

the tube swallowed for a distance of thirty-four inches from the teeth, in two different individuals of approximately the same height. Although the length of tubing is identical, there is a marked variation in the location of the end. Where medication is to be injected through the tube, in order to reach the duodenum or jejunum, it would be impossible entered the intestine, without röntgen ray localization.

In the case of partial or complete obstruction to the flow of fluid through the tube, a röntgenogram therefore to determine exactly where this medication may indicate the cause. If a coiling or kinking of the tube is demonstrated, complete removal of the tube may be unnecessary. By carefully removing a small amount of tubing, the kinking or coiling may be undone, thereby permitting the fluid again to flow freely without the necessity of repassing the tube. On the other hand, the röntgenogram may show that the cause of the obstruction cannot be altered, and that removal of the tube is essential. Thus, Fig. 5 indicates the presence of a knot in the course of the tube. This was verified on removal of the tube.

When it is desired to study the nature of the intestinal fluid at varying levels for purposes of comparative study, accurate röntgen ray localization is

essential. To judge by the length of tubing swallowed may lead to error, as the tube may be coiled on itself in some part of its course.

In introducing food, knowledge of the exact location of the tube is of value. The end of the tube

1. The possibility of the regurgitation of food back to the beginning of the duodenum, and perhaps into the stomach, is thereby reduced to a minimum, particularly when the food is introduced slowly by the drop method.

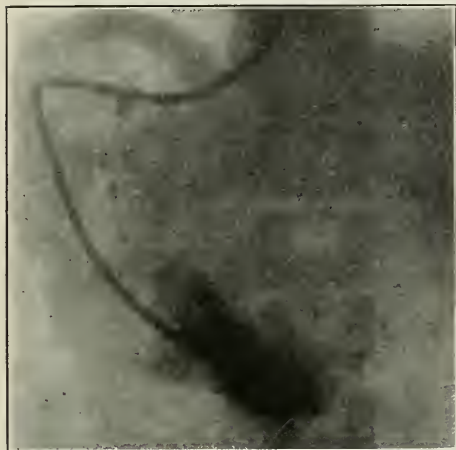


FIG. 1.—Röntgenogram indicating that the end of the tube is not present in the duodenum, but definitely ascertained duodenal fluid was obtained in this case.

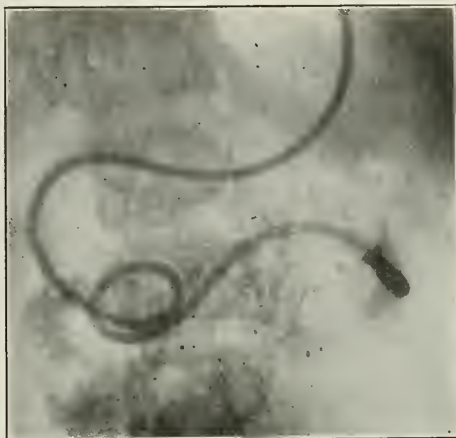


FIG. 2.—Röntgenogram of tube, indicating that coiling may occur in some part of its course.

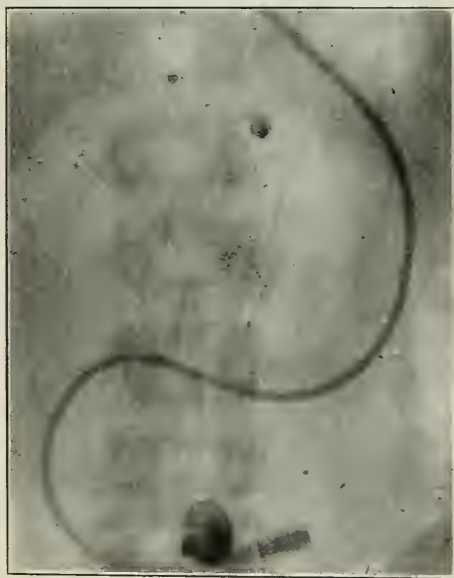


FIG. 3.—Röntgenogram showing the tube swallowed for a distance of thirty-four inches, and it is still within the duodenum. Compare with Fig. 4.

should be in the upper part of the jejunum, just beyond the duodenojejunal junction, for the following reasons:



FIG. 4.—Röntgenogram showing the tube swallowed a distance of thirty-four inches from the teeth. This patient is approximately the same height as the one in Fig. 3, but there is a marked difference in the location of the end of the tube, in this case, the end being well advanced into the jejunum.

2. If the end of the tube is not advanced sufficiently far, changes in position by the patient may displace the tube back into the stomach. Such an occurrence, by necessitating the repassing of the tube, may prove time consuming and discouraging to the patient.

3. In case of vomiting, a tube inserted just within

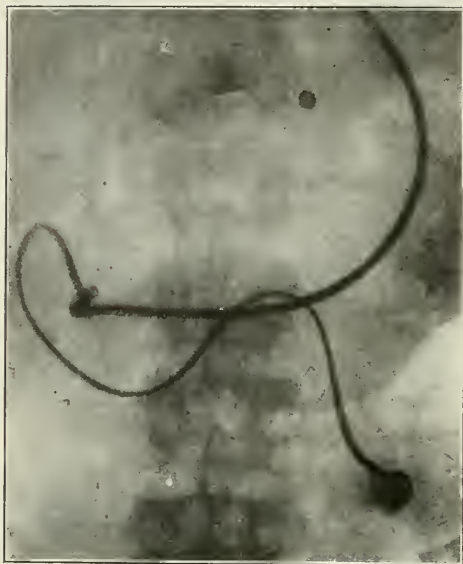


FIG. 5.—Röntgenogram of tube indicating cause of obstruction. In this case, the tube became knotted.

the duodenum may be vomited, whereas a tube if hooked around the duodenojejunal junction may resist expulsion.

However, the end of the tube should not be advanced too far within the jejunum. It is probable that the digestion and absorption of food takes place less efficiently the further away from the source of pancreatic secretion the food is introduced.

I have made the following observation. In one case I introduced the rubber tube for a distance of thirty-four inches from the teeth. This brought the tube to the end of the duodenum. The metal bulb at the end of the tube had been sewed on with chromic catgut (Van Horn). Röntgenograms were taken to determine how soon the bulb would detach. It became detached within thirty-six hours. A few days later, another tube was passed in the same patient, this time for a distance of forty-eight inches from the teeth. A similar bulb had been sewed on in the same manner with a piece of catgut from the same strand. This time, however, the detachment of the bulb was not observed until seventy-two hours after the tube had been swallowed. The delay in the digestion of the catgut in the second case was probably due to the further distance of the catgut from the source of the pancreatic secretion.

Hence, in introducing food through an intestinal

tube, if this be introduced at too great a distance from the ampulla, the food may fail to mix with the pancreatic and biliary secretions with sufficient intimacy to obtain the maximum degree of utilization.

Thus, though it is best to introduce the end of the tube just beyond the duodenum into the beginning of the jejunum, to minimize regurgitation of food and displacement of the tube back into the stomach, it is probably a disadvantage to introduce the end unnecessarily far within the jejunum. Accurate determination of where the end of the tube is can be accomplished only by means of the x ray (Fig. 6).

SUMMARY.

1. Various methods recommended for determining the location of the intestinal tube beyond the stomach are, with the exception of the x ray, at best highly suggestive, and may be misleading.

2. Even the aspiration of duodenal fluid, while acceptable as a rule, may occasionally prove unreliable.

3. The x ray is essential for accurate determination of the exact area from which intestinal fluid

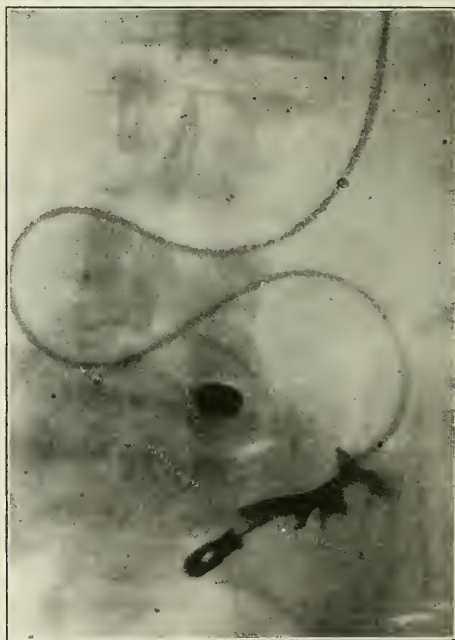


FIG. 6.—This picture indicates the tube hooked around the duodenojejunal junction in order to anchor the tube and prevent displacement or regurgitation of material when the tube is used for feeding.

for study has been obtained, and also for the exact point of entry of medication and of food.

4. The x ray will often help to determine the cause of obstruction in the course of the tube.

1 WEST EIGHTY-FIFTH STREET.

A Comparison of Successive Aspirates of the Gastric Contents *Its Interpretation Applied to the Method of Fractional Analysis**

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and HARRY J. JACOBSON, M.D.,

Detroit.

The method of fractional gastric analysis has been extensively adopted and according to the literature (1) almost universally accepted as giving an accurate picture of the stomach work throughout all its phases. Doubt is, however, thrown on its value by Gorham (2), who assumes that for the method to be correct, each specimen withdrawn must represent the stomach contents as a whole at that particular time. Wheelon (3) also makes the same assumption and both show that the stomach contents are not a homogeneous mixture. This is shown by aspirating the whole of the contents in portions of five to ten c. c. in quick succession and finding a variation in the acid content of the different aspirates.

Before proceeding with physiological investigations, it was decided to satisfy ourselves as to the value of the fractional method of analysis, to determine how closely the acidity of a five to twenty c. c. sample aspirated through the small tube approximated other samples aspirated at the same time, and to consider the interpretation of any variations which might occur.

Procedure.—In each observation the small Reh-fuss or our own tube (4) was swallowed without water and the contents withdrawn in five to twenty c. c. portions in rapid succession. Note was made on each specimen of 1, the amount; 2, the percentage of solids after standing one hour; 3, presence of mucus; 4, bile; 5, free hydrochloric acid, and 6, total acidity.

These experiments were carried out on a series of fasting contents, a series after the Ewald breakfast, and on a series of patients who were undergoing the Sippy treatment of ulcer.

To ascertain the variation in acidity, the lowest figure for any one portion was subtracted from the highest of any one portion extracted at the same time. The differences in each case were added together and divided by the number of cases to get the average variation.

FASTING CONTENTS.

These were examined in fifteen patients of whom nine showed no gastric symptoms, three cases were diagnosed duodenal ulcer, one prepyloric ulcer, one gastric carcinoma, and one achylia gastrica.

There was a marked variation in the amount of swallowed mucus. One case (ulcer) showed the presence of olive oil (taken twenty-four hours previously) in about equal amounts in each of five ten c. c. portions. Three showed bile in all portions.

The average variation of total acidity was eleven degrees, with a minimum of seven degrees and a maximum of eighteen degrees. One case showed no free hydrochloric acid in any portion. Of the cases showing free hydrochloric acid the average

variation was nine degrees with a minimum of five degrees and a maximum of thirteen degrees.

CONTENTS AFTER EWALD MEAL.

Forty-five observations were made. Five subjects were apparently well; fifteen suffered from extraabdominal conditions, such as incipient pulmonary tuberculosis, sacroiliac disease, and heart disease; fourteen were classified as extragastric abdominal cases, such as chronic constipation, chronic appendicitis, and cholecystitis; eleven were actual gastric cases, five being diagnosed duodenal ulcer, two gastric ulcer, two gastric carcinoma and two achylia gastrica.

Bile was present in all portions in three cases and in only one or two portions in four cases. The solid content showed much variation, the minimal variation being about five per cent. and the maximal eighty per cent.

Variation in free hydrochloric acid.—Six showed no free hydrochloric acid in any portion; twelve showed less than five degrees variation; twelve showed between five degrees and ten degrees variation; nine showed between ten degrees and fifteen degrees variation, and six showed over fifteen degrees variation. The average variation was eight and three tenths degrees.

Variation in total acidity.—Twenty-one showed less than ten degrees variation; twelve showed between ten degrees and twenty degrees variation, and twelve showed over twenty degrees variation. The average variation was twelve and two tenths degrees.

In respect of the comparative variation between normal stomachs, those showing actual disease, and those in which there was extragastric abdominal disease, we might state that the greatest variations were seen in those cases with ulcer or gallbladder disease, yet this was so inconstant that actual figures show about the same average. Fig. 1 shows the minimal variation and Fig. 2 the maximal variation encountered, while Fig. 3 shows the average for the forty-five cases.

CONTENTS ASPIRATED IN ULCER CASES.

The stomach contents in this series were aspirated in ulcer cases while the patients were taking four ounces of cream every two hours, with alkali one hour between feedings. There were twelve observations in three cases, all showing some degree of pyloric obstruction. Bile was present in all portions on three occasions. Six showed no free hydrochloric acid in any portion (shortly after alkali) with an average variation of total acidity of twenty degrees. Six showed free hydrochloric acid present with an average variation of forty degrees, while the total acidity showed an average variation of thirty-five degrees.

One observation was particularly enlightening and is shown in Fig. 4. Here the tube tip evidently fell

*Presented before the Detroit Society of Internal Medicine, December 27, 1921.

to a part of the stomach in which the material showed free hydrochloric acid for five twenty c. c. portions and was then replaced by material containing calcium carbonate and sodium bicarbonate, yet unmixing and unneutralized.

It has been shown that the stomach contents are generally not a homogeneous mixture, indeed a consideration of the physiology of the stomach (5) shows one that the fundic portion of the stomach alone acts as a reservoir for retaining the bulk of the food and normally remains in tone, slowly pushing its contents into the pars media and antrum where the peristaltic movements mix and liquefy and at intervals eject the chyme through the pylorus into the duodenum. It is also true that the acid

stances. Any marked sudden deviation of the curve can be explained by a change of position of the tip of the tube, or by duodenal regurgitation. The chief cycle of stomach chemistry takes place in the pars media and pars pylorica which are the lowest parts of the organ. If the tube tip is of sufficient weight to sink in the stomach contents and if the patient stays in a sitting position, or if reclining remains supine, these conditions are in the majority of cases fulfilled and a steady curve is obtained. Repeated x ray observations have convinced us that the tube tip, due to gravity and peristalsis generally rests near the outlet of the stomach, therefore the fractional method with proper technic represents the cycle at that most important portion of the stomach

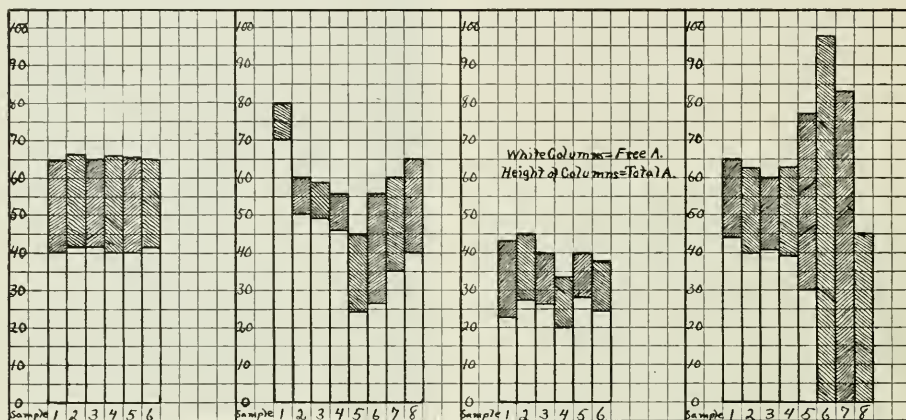


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 1.—Represents case showing the minimal variation. Aspirated in six 10 c.c. portions in rapid succession at one hour after Ewald meal. Shows variation of two degrees in both free and total acid. White columns show free acid; height of columns, total acid.

FIG. 2.—Represents case with the maximal variation encountered. Aspirated in eight 10 c.c. portions in rapid succession at one hour after Ewald meal. It shows a variation of forty-six degrees in free acid and thirty-five degrees in total acid. White columns, free acid; height of columns, total acid.

FIG. 3.—Shows case with the average variation of acidity out of forty-five observations. Aspirated in six 10 c.c. portions at one hour after Ewald meal. Average variation of free acid was eighty-three degrees and of total acid was 12.2 degrees. White columns, free acid; height of columns, total acid.

FIG. 4.—From a case of prepyloric ulcer with pylorospasm. Aspirated in eight 20 c.c. portions in rapid succession while on ulcer management. Had taken four ounces of cream two hours and one dram of alkali one hour previous to aspiration. White columns, free acid; height of columns, total acid.

secreting cells are present to some extent in the fundus but chiefly in the pars media and none in the antrum (6). Duodenal regurgitation is not an uncommon finding. Rehfuess (7) and his coworkers found bile in a large proportion and trypsin almost constantly in the stomach contents.

It has rightly been considered (8) that the gastric contents are a mixture of salivary, gastric, pancreatic and biliary secretions, and that any tests based on stomach chemistry are subject to great variation.

Obviously the acidity of any one portion extracted through the small tube depends on the location of the tip of the tube and gives the character of the contents of that part at the time. Just as obvious is the assumption that if the tube stays in the same place one could, by extraction at definite intervals, obtain the cycle of events through a long period. This we believe is what happens and the reason one gets such beautiful curves in the majority of in-

allowing one to observe the acidity, presence of pathological products, duodenal regurgitation and the presence or absence of food (emptying time). We believe it is the best method of investigating the stomach work at our command, yet like most other methods of physiological investigation, has certain drawbacks requiring proper interpretation. Its value as a diagnostic procedure in clinical medicine cannot be here discussed. Suffice it to say that Rehfuess states that there is no curve diagnostic of any disease, and that acid determination is the least of its values.

CONCLUSIONS.

1. Different portions of the stomach contents aspirated in quick succession, through a small tube, show a moderate variation in physical character and acid contents.
2. The tube tip usually rests near the outlet of the stomach if the subject remain seated or supine.
3. When small amounts are aspirated at regular

intervals one gets the cycle of events as they occur in the pars media and pars pylorica, the mechanically and chemically active portions of the stomach.

4. In our discussion we have attempted to show that fractional gastric analysis does in the majority of cases give us fairly accurate information on the normal or pathological physiology of the most important functions, and is our best method of determining food and drug action on the stomach.

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Standardization of the Test Meal

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A patient presenting a certain train of symptoms and showing certain physical signs, and yielding certain laboratory data, is said to have a definite disease; let us say that it is lobar pneumonia. Should a similar case present itself to a physician whose skill is equal to that of the first physician, he, too, would call it lobar pneumonia. Should either or both of these cases be of unusual interest for any reason, and therefore published in our journals, physicians universally would understand and appreciate the report and profit by it. It is because of this universal understanding and acceptance of terms that men working at distances can intelligently discuss cases. It is largely by standardization of terms that we learn and progress. No one will deny the forward step made by the B.N.A. classification of anatomical structures, whereby we now understand each and every part of the human body by one name, and not by a few.

As it has been with symptoms and diseases, so should it be with clinical laboratory tests. That it is so with most of our laboratory procedures will not be denied. An investigator in one part of the country who does a gram stain on a smear and makes his report is reasonably sure, allowing, of course, for the personal equation that a colleague many miles away will use the same technic and materials in carrying out his gram stain, and make the same report on the same smear. And it is the same in cultivating bacilli from a throat culture, or in doing a red or white blood count. Certain standards must be set and these standards must be adhered to if we are to obtain comparable results and profit and learn by them. Individual endeavor is laudable if the results obtained can be applied universally, but if only the individual concerned can understand his results then his labors do not add much, if anything at all, to the common knowledge. It is inconceivable that not all of us are agreed that standardization of technic and absolute accuracy in laboratory work is paramount to progress in this field. Halfhearted methods mean unreliable results, and unreliable re-

sults are worthless. Absolute accuracy and precision is what we want. The one outstanding procedure, and one which in many instances is performed in "an-accurate-enough-for-ordinary-purposes" attitude is gastric analysis.

I daresay it is the opinion of a large number of medical men that gastric analysis is of only slight significance, that but little reliance is to be placed on it. Why? Can there be any more direct way of finding out what an organ is doing than by going right into it and examining it. If a patient presents himself with a sore finger, our first thought is an examination of the injured member. Then why not, if a patient presents himself with evident gastric symptoms examine his stomach? Surely the giving of a test meal and the examination thereof is a simple procedure, and not over timeconsuming. Then agreed that a test meal would be instructive, what are we going to feed our patients. And it is here that a wide variety of opinions is encountered, and it is here that standardization is so wanting. To determine the exact status of the procedures employed, the following questionnaire was submitted to hospitals in various parts of the country:

QUESTIONS ASKED.

1. How is the patient prepared for an Ewald test meal, that is, for what period of time does he starve?
2. Of what does the meal consist?
3. How much of each component of the meal is the patient fed?
4. Is this amount accurately weighed and measured?
5. Is the fasting stomach aspirated prior to the feeding of the patient?
6. Is the fractional method of examination employed; if so, what is the interval between aspirations?
7. If not fractional, how long do you wait before aspirating?
8. Do you aspirate the entire amount, or merely enough for a quantitative examination?
9. If you aspirate the entire amount, do you place any significance upon the amount recovered?
10. As compared with other laboratory tests, how often is gastric analysis employed in cases, seemingly with some abdominal pathology?

<i>Name of Hospital</i>	<i>Period of Fasting</i>	<i>Components of Test Meal</i>	<i>Is the Fasting Stomach Aspirated?</i>	<i>Is the Fractional Method Employed?</i>	<i>What Time Elapses Before the Single Evacuation?</i>	<i>Is the Entire Residuum of the Meal Aspirated?</i>	<i>Is Merely Enough for the Examination Aspirated?</i>	<i>Reagents Employed</i>
City Hospital, New York . . .	16 hours	2 slices toast 1 cup tea	No	No	45 minutes	No	Yes	Free acid: Tüpfers Total acid: Phenolphthalein
Cook County Hospital, Chicago..	Overnight	1 cup tea without sugar 1 piece of toast without butter	No	No	60 minutes	Yes	No	As above
People's Hospital, New York . .	Overnight	1 roll 1 glass of either tea or water	Only if retention suspected	Occasionally — Aspirations every 10 minutes	30 minutes	Yes	No	As above
Harper Hospital, Detroit, Mich..	12 hours	1 shredded wheat biscuit 400 c.c. water	Yes	Yes Aspirations every 15 or 30 minutes	60 minutes	Yes	No	As above
Beth Israel Hospital, Newark, N.J.	12 hours	2 heaping teaspoonfuls of cracker meal 1 glass of either water or tea	Yes	Yes Aspirations every 20 minutes for 2 hours			Yes	As above
Passavant Hospital, Pittsburgh . .	12 hours	1 slice of bread 300 c.c. water	Yes	No	60 minutes unless achylia suspected	Yes	No	As above
Newark City Hospital, Newark, N. J.	12 hours	1½ thick slices stale bread (60 gm.) 1½ glasses water (300 c.c.)	Yes	Yes — Aspirations after 15 or 20 minutes until free acid found or stomach empty	60 minutes	Yes	No	As above
Montefiore Home and Hospital, New York	Overnight	4 soda crackers 2 glasses water	Yes		45 minutes	Yes	No	As above
Lincoln Hospital, New York . . .	Overnight	2 slices of toast 1 glass tea	Yes	Rarely used — Aspirations every 15 min.	45 minutes	Yes	No	As above
Jefferson Hospital, Philadelphia .	12 hours	2 half inch slices of white bread without crust 350 c.c. tea	Yes	Yes — Aspirations every 15 minutes for 2 hours		Yes	No	As above
French Hospital, New York	Overnight	1 roll 1 glass water	Yes	No	45-60 minutes	No	Yes	Free acid: Methyl orange Total acid: Phenolphthalein
Broad Street Hospital, New York	Overnight	1 piece toast 1 glass water	No	No	45 minutes	Yes	No	Free acid: Tüpfers Total acid: Phenolphthalein
Vanderbilt Clinic, New York	7 hours	4 soda crackers 4 paper cups of water	Yes	No	45 minutes	Yes	No	As above
Massachusetts General Hospital, Boston	15 hours	1 slice of bread of moderate thickness without crust 1 glass water	Yes	Yes, on one service — 3 aspirations at ½ hr. intervals	Yes, on another service — 60 minutes	Yes	Yes, when fractional method is employed	Free acid: Tüpfers Total acid: Phenolphthalein
Mayo Clinic, Rochester, Minn.	Overnight	8 arrow-root biscuits 400 c.c. water	No, except in special cases	Yes, beginning after one hour, aspirations every 15 min.	60 minutes	If free acid, entire uneaten, and always empty stomach on last aspiration	No	As above
Fordham Hospital, New York . . .	17 hours	Either a roll, or 2 pieces of dry toast 250 c.c. water	No	No	45 minutes	Yes	No	As above
Bellevue Hospital, 3rd Surgical Division, New York	Overnight	Heaping tablespoonful of oatmeal and one quart of water boiled down to one pt.	Yes	Yes 2 aspirations at one hour intervals		Yes	No	As above
Lebanon Hospital, New York . . .	Overnight	1 roll 1 glass tea	Yes	Yes — Aspirations every 15 minutes for 2 hours	45 minutes	Yes	No	As above

Chart showing the results of replies received from hospitals in answer to personal inquiries made concerning the test meals employed. At St. John's Hospital, Long Island City and St. Vincent's Hospital, Erie, Pa., these methods are not employed, as they are considered of slight importance. In no instance are the components of the test meal weighed or measured in these hospitals except at the Mayo Clinic, and here it is not done each time.

11. In doing the quantitative tests, what reagent or reagents is used for the determination of the free hydrochloric acid, the combined hydrochloric acid, and the total acidity?
12. Are there any tests made for organic acids, other than that usually made for lactic acid?
13. What is the attitude of your staff concerning the value of gastric analysis?

In addition the literature on the subject was surveyed and personal inquiries were made in order to obtain a comprehensive conception of the test meals employed.

In the appended chart the results of the replies received from twenty hospitals scattered in the East and West are presented. The period of fasting in every instance is adequate, overnight is the usual length of time. But the components of the test meal vary markedly. By referring to the chart it is seen that there is a striking difference in the meals employed in each of the hospitals recorded. This same discrepancy holds true of the meals used by individuals in both their office and hospital practice. In none of the hospitals is the meal accurately weighed and measured; but in private practice and the literature consulted, it was noted in a few instances that this precaution is taken. The fasting stomach is aspirated in most instances, although in four of the hospitals this important and instructive procedure is omitted. Where the single evacuation of the meal at the end of a stated interval is made use of, which is in seventy-five per cent. of the hospitals studied, the interval of time varies from thirty to sixty minutes, forty-five minutes is the average. Some hospitals and individuals employ both the fractional and single evacuation methods, but the latter seems to be favored. Seventy per cent. of the hospitals aspirate the entire residuum of the meal at the end of whatever interval of time they employ. With but one exception the reagents employed for the quantitative estimation of acid are identical. The opinions as to the value of this procedure varied a good deal, but the consensus of opinion seems to be that it is an aid to diagnosis in certain cases, such as achylia.

VARIATIONS IN TEST MEAL.

It is clear from this summary that there are marked variations in the test meal, and that those meals in common use vary considerably. Toast, cracker meal, gruel, crackers, indefinite sized slices of bread, water, tea, shredded wheat, etc., are used; nor is it to be assumed that these components are weighed and measured accurately. Obviously slices of bread differ widely in weight, depending upon the individual making the slice; toast is made from either fresh or stale bread, which differ chemically, the stale bread being more sour, that is, contains more organic acid (14). And so on. One can enumerate the deficiencies of the many variations of the Ewald meal. Yet when observers report their results, and state that the Ewald meal was used, we are told in some instances of what the meal consists, while in others we are not; with the result that a comparison of the results obtained are rather contradictory. Rehfuess and Hawk (16) assert "that there is absolutely no value in a complexity of test meals which only introduces confusion to a subject already sufficiently complex."

Quoting again from Rehfuess and Hawk (16)

"one of the greatest drawbacks in gastric analysis is the lack of standardization," and further on these same observers state (16) that "we have only begun to realize the possibilities of gastric analysis." Are we going to increase our knowledge in this field by individual or combined effort? Decidedly the latter. When we have a number of persons doing the same thing in the same way, we learn, for in this way the faults and good points of the problem are brought out and corrected. So it is with gastric analysis. We should all use the same test meal, wait the same length of time before aspirating, use the same type of tube, and employ the same chemical reagents in examining the contents. Then we will begin to see the shortcomings of our meal, and be able intelligently to correct them. In this way gastric analysis will be brought up to its proper rank of importance as a diagnostic aid. If we are to elevate gastric analysis to the place it deserves as an aid in diagnosis, standardization is of the utmost importance. We must rid ourselves of the encumbrance of too many modifications of the test meal. Let us agree on one meal and accept this as standard, and then let us conscientiously employ this meal and report our results with it. Certainly this is a logical way of going about investigating the usefulness and limitations of a given procedure. By standardization we may hope to add to our present faulty understanding of the physiology and pathology of the stomach.

What better way is there for the determination of stomach function and dysfunction than the introduction into the stomach of certain known chemicals, that is, the test meal? Then after a definite interval of time, the aspiration of these altered chemicals from the stomach, and their careful examination. Chemistry is exact, and under like conditions two reacting chemicals will always give the same end reaction. The combination of hydrogen and chlorine under favorable conditions will always give hydrochloric acid and nothing else. If we know the chemical composition of the test meal we are employing and then the altered chemistry of this meal after its sojourn in the stomach for a definite length of time, we are in a position to judge, at least in part, the complex chemical changes which our meal undergoes in the course of its digestion by the stomach. The chemistry of the stomach is complex enough, and by using certain known chemicals (a standard test meal) we make our problem of investigation a little easier. Can it be assumed that tea and gastric juice will give the same result as water and gastric juice? It cannot. We are dealing with chemicals and chemistry and we must always employ the same reagents to obtain comparable results. "It is clear that the gastric response varies with the type of the meal and there is more or less specificity in the response to various foods" (17). The test meal is the best means we have to determine the chemistry of the stomach, it is also invaluable in giving us information about the motor activity of this viscus. Finely divided chyme has not the same significance as has coarse food particles, nor the recovery of ten c. c. the same import as the recovery of one hundred c. c. Nor does red or green colored contents mean the same as white or cream colored contents.

TYPE OF TUBE USED.

The question of what tube to use for aspirating the stomach is and has been extensively discussed, and much can be said for both the Ewald and the Rehfuß tubes. But the fractional method, while probably a good one for determining the secretion of the stomach, tells us little of its motor activity unless employed over a period of two to three hours. Also it has been argued that the tube collects secretion from but one part of the stomach, and that the gastric contents is not a homogeneous fluid (21), and little can be learned of the solid portion of the meal, unless finely divided, for coarser particles will not enter the tube because of its small calibre. It is not within the scope of this paper to argue the pros and cons of this controversy; however, it seems to me that the Ewald tube is the better of the two, and that it should be employed at the end of a definite interval. The author agrees with Gorham (11) that in order to speak of a quantitative gastric analysis the stomach must be completely emptied at a definite time after a standard test meal.

As a standard test meal why not go back to, or rather continue to use the Ewald test meal, described many years ago (8); but let us not use either tea or water as Ewald suggests, but water only. For teas differ considerably from each other, depending upon the locality from which they come, and the time and method employed in brewing. Our standard meal then will consist of thirty-five grams of fresh roll and three hundred c. c. of tap water, accurately weighed and measured. This meal to be fed to the patient after a period of fasting of at least six hours. Prior to the feeding the fasting stomach is to be aspirated, and if residue be found, the stomach is to be washed until it is clear of residue. Now the patient is fed the meal in the doctor's office, the clinic, or hospital; he is advised to eat slowly and chew his food well, this obviates to a large extent plugging of the tube by coarse food particles. After eating, the patient rests quietly for an hour and then whatever of the meal remains in the stomach is aspirated in its entirety with the Ewald stomach tube and submitted to the usual examinations, physical, chemical and microscopic. This meal is simple, readily accessible, contains all of the foods, namely, albuminoids, sugar, starches, nonnitrogenous extractives, and also salts; it stimulates the flow of gastric juice, it is readily liquefied and so makes its expression through the tube easy; and lastly, we have accumulated knowledge of its value in both normal and diseased stomachs over a period of more than a quarter of a century.

IMPORTANCE OF STANDARDIZED METHODS.

It is interesting to note that in a recent report of the Public Health Administrator of England (15) it is stated that "twenty-five per cent. of all patients seeking relief in our clinics did so for gastrointestinal disorders." Now if the percentage is so high in England, can we not safely assume that it is at least as high here in America? Or even if it is lower, say one out of every six or seven patients who come to us has a gastrointestinal complaint, is it not important for us to have definite standardized methods of procedure in these cases? Do we

not owe it to this large group of patients to standardize our methods, so that reliable data may be obtained for them, and thus help in the therapy and diagnosis of those afflicted with gastrointestinal disease? An editorial in a medical journal (6) says: "The situation has become so complicated that many practitioners have frankly confessed their inability to derive as much dependable information from modern gastric analysis as the importance and long maintained prominence of the subject would seem to warrant." Can it not be expected that the standardization of the test meal will tend to make this subject less complicated, and the results obtained more dependable?

SUMMARY AND CONCLUSION.

There is a definite lack of standardization of test meals for which there is no evident good reason. Standardization is not a difficult matter and should be brought about. It has been suggested that the Ewald meal, consisting of thirty-five grams of fresh roll and three hundred c. c. of tap water, be used. This meal to be weighed accurately and measured and eaten in the doctor's office, clinic, or hospital. Before feeding, the fasting stomach is to be aspirated and freed of residue, if there is any. Then an hour after the ingestion of the meal, it is to be entirely aspirated and subjected to the usual chemical, physical and microscopic tests. It is not contended that this meal is the best meal that may be devised, but it is true that much excellent work has been done with it for over twenty-five years and therefore our accumulated knowledge concerning it is very great. The prevalence of gastrointestinal disease has been hinted at.

In conclusion I wish to express my gratitude to those physicians who have so freely given me the information that has made this paper possible.

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616 MADISON AVENUE.

³ A complete list of references will appear in the author's reprints.

FERNAND WIDAL.

By MALFORD W. THEWLIS, M.D.,

Paris.

Cochin Hospital, Paris, is a busy institution. Doctors and students from all parts of the world are seen in the clinic of Professor Fernand Widal, one of the foremost clinicians whose name is known the world over, not only on account of the reaction for typhoid fever, which he discovered, but on account of his many other investigations.

Widal holds the Laureate of the Institute and Laureate of the Faculty of Medicine, Laureate of the Academy of Medicine, besides many other titles. In 1886, 1887 and 1888 he was demonstrator of pathological anatomy at the Faculty, and from 1889 to 1895 gave a practical course of bacteriology at the laboratory of Professor Cornil.

Before 1886, when Widal, in collaboration with M. Chantemesse, made investigations on typhoid fever, not much was known about the bacteriology of this disease. Eberth had discovered bacilli on cuts of spleen and mesenteric ganglions; Fränkel and Simmonds asserted that they had injected mice with Eberth's bacillus; Michaël and Moers had discovered in water the presence of a microbe analogous to that of Eberth, but their assertions were attacked by the school of Pettenkofer. Such was the state of things when Widal began his work and from 1886 he made various studies upon the bacteriology of typhoid fever and proved that Eberth's bacillus was the specific organism of this disease. He later contributed, with M. Chantemesse, to the determination of the rôle of drinking water in the production of typhoid. On June 26, 1896, he made a report to the Medical Society of Hospitals, showing how to make an accurate diagnosis of typhoid fever in a few minutes. When Widal began the researches of serodiagnosis the phenomenon of agglutination had already been studied for many years, but up to that time agglutination had always been regarded as a reaction which appeared only in the immunized animals and this conception prevented medical men from grasping the significance of the phenomenon for the diagnosis of diseases. Widal proved that the antitoxic, bactericidal and agglutinating properties were often coexisting but could also be dissociated in the same serum and that the different qualities acquired by a serum during the infection, though they sometimes seem to be on a par, are relatively free from one another.

Serodiagnosis of typhoid fever was made simple by Professor Widal, as he states "a simple and rapid method, which requires no elaborate material, not even stains. All that is required is a pure broth culture of Eberth's bacilli, which can be kept for weeks, a microscope with an immersion lens, and a drop of blood or of serum from the patient."

Widal and Sicard noted, further, that the agglutination reaction is obtained not only with typhoid serum, but also with other secretions from typhoid patients—serous fluid of blisters or of edema, tears, bile, and exceptionally, urine.

Widal's researches in cytodiagnosis are important: cytodiagnosis of tuberculous meningitis; also of tabes. Typhoid pleurisy was the subject of an interesting investigation; others were the "cold suppuration in typhoid fever;" specificity of typhoid osteomyelitis; diseases caused by colon bacilli, paratyphoids, bacillary dysentery, and important studies on the affections caused by various organisms.

In a surgical room where there was endemic tetanus, M. Widal showed that the infectious agent seemed to reside in the joints of the flooring under the beds, and showed that puerperal tetanus was of the same nature as the surgical type.

The communications Widal has made, with Lemierre, on the rôle of sodium chloride in the pathogeny of edema of nephritis and the dechlorination cure for Bright's disease, proposed by Widal and Javal, added a most important chapter in the treatment of diseases of the kidneys, as well as that of edema from other causes. On June 19, 1903, Widal announced an important contribution, on the retention of sodium chloride in cardiac edema, and in collaboration with Javal, on June 26, 1903, in the same bulletin, there was published an article on "the cure by dechlorination. Its action on edema, on hydration and on albuminuria and certain periods of epithelial nephritis."

Widal and his pupils have proved the rôle played by chloride of sodium in the production of edema in Bright's disease. They have proved that salt is a dangerous element in many cases. Widal also studied dechlorination in cardiac diseases and the whole investigation covers a mass of scientific work which is of great use in the treatment of these diseases. He made experimental researches on the treatment of diphtheria and noted the effect of antitoxin in preventing this disease. He also found that the germs of tuberculosis can persist a long time in river water.

His teachings cover almost every disease, including diseases of the kidneys, liver, spleen and digestive tube, diseases of the blood, and perhaps one of his most important recent studies is on diseases of the kidneys. In an article of this length it would be impossible to mention all of his important researches. He has a remarkable didactic gift and one always leaves his clinic greatly stimulated. His weekly conferences are attended by physicians from all parts of the world; he devotes an hour to one disease and his lecture begins with the exhibition of a patient and the discussion is built up on this clinical study. He is, undoubtedly, one of the greatest clinicians of the world.



FERNAND WIDAL.

Editorial Articles

THE PATHOGENESIS AND TREATMENT OF PHLEGMONOUS GASTRITIS.

The pathogenesis of phlegmonous gastritis would seem to be a simple matter. The bacteria usually penetrate the mucosa by way of an ulceration or a more or less extensive erosion. Contamination may also ensue from a peritoneal fissure and eruption of pus into the gastric cavity. It may likewise result from swallowing pus coming from an abscess in the throat, the esophagus or mediastinum opening into the gullet, or from purulent sputum derived from the bronchi or lungs. It is to be noted that the bacterium found in the pus from the bronchi is the same as that found in the stomach and that among a number of cases of pneumococcal gastritis three succeeded pneumococcal bronchopneumonia (Loeper).

Propagation may also take place by way of the lymphatics, along the walls of the esophagus or cardia. Certain esophagitides extending under the mucosa, or peritoneal pus foci in contact with a gastric ulcer or neoplasm, diffuse the infection in the gastric walls by way of the lymphatics. These pathogenic mechanisms explain a large number of cases of phlegmonous gastritis, but not all, and although a point of entrance may be present in the gastric mucosa, the infection may be an indirect one by way of the blood. A cutaneous or visceral focus of suppuration which harbors the streptococcus or staphylococcus may result in the bacteria reaching the stomach—normal or pathologically changed—where they develop. A simple or neoplastic gastric ulcer may serve as the point of election and hence become secondarily infected. A normal stomach is not immune to pyemic infection.

This is the only explanation which can be offered for gastric infections or abscesses arising in puerperal infection, scarlet fever, prostatitis, erysipelas and pyemia. In their experimental work carried on some time since, Loeper and Esmonet found streptococci and the tubercle bacillus in the walls of the stomach following intravenous injections of these bacteria, and they even detected inflammatory foci composed of considerable masses of polynuclears in the submucosa of the stomach, cecum, and large intestine. Hayem discovered pneumococci in the gastric submucosa in a case of bronchopneumonia and Dieulafoy, in general infections due to this organism. Théohari, Enriquez and Hallio found that intravenous injections of the toxins themselves produced lesions of the gastric walls. In some instances the pneumococcus or streptococcus has been found in the blood before the gastric phlegmon had

become clinically manifest. Hence, contamination by the blood is possible and a preexisting gastric lesion is not always necessary or sufficient for producing the phlegmonous process. The frequency of gastric lesions giving rise to phlegmonous processes of the stomach require prophylactic therapeutics, such as lavage and antiseptics of the organ. Broths and meat of every kind should be abstained from so long as any lesion of the gastric mucosa exists, and above all when it gives rise to hemorrhage. Sodium bicarbonate and especially bismuth, limewater and sodium chlorate are decidedly indicated, because they protect the lesions and hamper the development of bacteria. The mouth and respiratory tract should be carefully looked after in order to avoid swallowing septic matter. Horse serum, being both coagulant and leucopoietic, may find its indications.

Phlegmonous gastritis once diagnosed, resection of the diseased portion of the stomach is about the only logical treatment and very few recoveries have been obtained by it. The pathogenic agent of phlegmonous gastritis is more frequently the streptococcus than the pneumococcus and little reliance can be placed on antistreptococcal serum, but the outlook from the use of antipneumococcal serum is more promising if the gastric infection should be due to that organism.

SURGICAL TREATMENT OF ASCENDING STERCORAL STASIS.

Constipation is met with in two very different forms. Retention in the right colon is accompanied by general disturbances due to intoxication and sometimes to infection of the organism; in the left colon, which is the usual form of constipation, it is a purely mechanical disorder. This difference is manifest if the movements and innervation of the intestine are studied, as has been done by Elliot and Smith, Boehm, Keith, to mention only the most important researches. Goiffon, in a series of experiments, has studied the composition of the intestinal contents in the different segments of the colon. In a subject placed on a mixed diet the cecal contents are characterized by the presence of starch, carbohydrates, partially digested muscle fibres and fat cells, especially the fatty acids, bacteria, and numerous iodophile clostridial bacteria; they are acid in reaction. In the descending colon starch and carbohydrates have disappeared; muscle fibres are few, as well as the iodophile clostridial germs; reaction is

neutral or alkaline. These differences explain the symptomatology of right or left stercoral stasis. Stagnation of feces in the right colon favors the development of toxic products from albuminoids, fats and carbohydrates. Bacteria may also enter the lymphatic circulation and give rise to complications.

The symptoms of constipation in the right colon are pain in the right iliac fossa and right hypochondrium. The lameness is permanent, and is increased by muscular involvement and prolonged erect position, especially during periods of constipation. Pain is often worse at night (two to three a. m.) at the time of repletion of the cecum and right colon by alimentary residue. Pain is very severe when gas fermentation distends the proximal colon which then forms an appreciable bulging under the abdominal walls. The pain extends to the infrahepatic region and right thigh.

The second symptom is chronic constipation interspersed by diarrheal debacles. Examination at the time of the diarrheal attacks will be negative if the colonic mucosa is normal, inasmuch as the stools will present the character of the normal contents of the cecum—rich in starch and cellulose, iodophile flora, and with an acid reaction. If the mucosa is pathologically changed the feces on the contrary are dark colored, fetid, and alkaline in reaction, because there is only a small amount of fatty acids and much ammonia. If the mucosa is much inflamed, there will be a continual false diarrhea. The stools are pasty and fetid, but by coprological examination they will show signs of relative colonic retention, absence of cellulose and starch indicating that in spite of their richness in water the stools have sojourned for some time in the colon. Radiology reveals stagnation of the feces in the right colon.

Thirdly, the toxic accidents. At the time of constipation the patient complains of various disturbances; headache, vertigo, nausea, abdominal malaise, an anemia sometimes serious, and occasionally icterus of hemolytic origin (Loeper); cholemia is frequent in these patients. Cerebral intoxication is made evident by the usual asthenia and nervous depression present in these cases. The tongue is coated, appetite poor and blood pressure low. The infectious accidents consist of slight pyrexia and infection of the gallbladder or kidneys. Palpation of the right colon shows its mobility, distention and sensitiveness—a painful spot over the cecum and right colonic angle and pain in the right colon when the left colon is palpated.

Medical treatment is that employed in chronic constipation. Surgical treatment should be reserved for the more serious forms. Abnormal mobility of the colon is dealt with by colon fixation, while in

strangulation by a pericolonic membrane the latter is to be excised. When at the same time there is mucous colitis cecostigmoidostomy is indicated for drainage of the dilated and infected colon. This operation does not interfere with the normal junctions of the colon as it merely drains off the abnormal products stagnating in its declivous segment. Recovery is slowly progressive but it is necessary to watch the intestinal junctions during this time.

ATTACKING EPIDEMICS AT THEIR SOURCE.

A commendable effort is being made by a group of public spirited citizens of New York, under the leadership of Dr. Royal S. Copeland, commissioner of health, to raise a sum of money sufficient to defray the expense of sending a sanitary relief expedition to Eastern Poland where danger is feared from the spread of contagious diseases, such as typhus, cholera and bubonic plague. With a view of arousing needed interest in the subject among the laity, Commissioner Copeland addressed recently a gathering of newspaper men at the New York Press Club, taking for his topic New York's Imminent Peril from Europe's Typhus Cholera Plague. By means of large maps especially drawn and colored he exhibited the geographical distribution of contagious diseases in eastern Europe, the Mediterranean ports and the islands between North America and the Mediterranean, and by buttons of different colors he indicated the starting points of typhus, cholera and bubonic plague in different regions.

It was shown that the germs of typhus were being carried into Poland and swept over into Germany by vermin infested peasants of Poland who had been previously driven into Russia by war and were now returning, bringing typhus and cholera in their train. Dr. Copeland made a number of valuable suggestions to his journalistic auditors in the way of getting them to enlist the support of people of wealth in financing a plan to destroy epidemic diseases at their source. A group of doctors and nurses might, he said, be recruited and sent to a point in Eastern Poland, preferably a railroad junction town, where immigrants coming in from Russia could be deloused and the town itself and its environs be cleaned up and put in sanitary condition.

For the work of protecting New York and the rest of the country by attacking epidemic diseases at their source in this way, the sum of \$25,000 is needed for the equipment of one unit. If New York will do this, other cities such as Boston, Philadelphia, Detroit, Chicago, St. Paul, Minneapolis and San Francisco may be inspired to take similar

action. If one hundred cities would do this and each group undertake to bring about the sanitary regeneration of ten miles of border territory, it would mean that one thousand miles of the border between Russia and Poland, where the dreaded epidemic diseases originate, would be converted into a sanitary barrier between disease stricken Russia and western Europe and the western hemisphere.

It is pertinent to observe that on the same day the newspaper men of New York were addressed by Dr. Copeland, it was made known by press dispatches that cholera had made its appearance in Armenia and in Georgia, and Dr. J. K. Marden, of Boston, Mass., speaking for the American Near East Relief Commission, has since reported cases of cholera at Tiflis, where a dangerous epidemic is expected unless the people can be mobilized to take measures for controlling the spread of the disease.

A committee of which Health Commissioner Copeland is chairman has been organized, with Archbishop Hayes and Bishop Manning lending their support and encouragement. Others who are taking a prominent part in the work include Charles K. Gilbert, Social Service Commissioner; James K. McVie, Society of Friends; Lauritz Larsen, National Lutheran Council; Henry H. Bizallion, Gotham National Bank, Elizabeth Marbury, John M. Fitzgerald and Nathan Strauss. The treasurer of the committee is Herman A. Metz, 122 Hudson Street, New York, to whom checks should be made payable.

NEW CONCEPTIONS OF TREATMENT.

It seems that, in many respects, methods of treating disease are undergoing such a change that it may almost be termed revolutionary. Sir James Mackenzie is largely responsible for these new conceptions of treatment. His view is that in order to prevent apparently slight complaints from developing into disease, or even before there are any obvious manifestations of deviation from the normal, steps should be taken to check their progress. The first volume of reports of the St. Andrew's Institute for Clinical Research, founded and presided over by Sir James Mackenzie, was issued recently. The essence of the doctrine preached by the founder is expressed by Professor Hering, of St. Andrew's University, in the following words. "The body furnishes an apparatus more sensitive than any laboratory instrument, and the slightest deviation from the normal reveals itself in altered reflexes before the most elaborate physical and chemical tests are applicable." That is to say, before many of the present methods of detecting disease can be employed, disease is present and is proclaiming its

presence. It is proclaiming it by a disturbance of what are called reflexes, or, if you will, responses of the patient to life. The patient's relationship to the world he lives in is altered. It follows that if we would detect the earliest signs of disease we must know the "mechanism" of living in a wide and broad sense. This, however, is exactly where our medical knowledge is so weak. In consequence, when changes occur in a man's or woman's method of responding to life, we are often unable to understand them, and so the signal of danger is missed. It is obvious that the only doctor who is at all likely to see these small early changes is the family doctor, the man people go to with their smallest complaints. He therefore must undertake the new research work into the earliest signs of disease.

The volume just published affords a new law, a new conception. Dr. MacNair Wilson, in a book published a short time ago on heart disease, expressed Sir James Mackenzie's and his own views, with regard to this new law and new conception, very clearly. He takes an analogy: When a strong man is hit, he hits back. There are then two events: there is the blow with its effect and there is the response to the blow, the recoil, with its effects, which normally should equalize the effects of the blow. We are hit in a multitude of different ways, yet to each "blow" or stimulus we must make an adequate response. In fact, while we are healthy we do make an adequate response to every stimulus. It follows that any falling off of response, any inadequacy, will represent a deviation from health, assuring that the blow or stimulus remains as before. In short, feeling sick is feeling unable to cope with life, to give it blow for blow.

At the present time our conception of and attitude toward disease is altogether different from this. Symptoms of disease are regarded as something separate from ourselves and treated accordingly. Disease may proceed from a psychological cause, from a toxic cause, from a mechanical cause or the bodily organs themselves may have broken down. However, this is the least likely, because disease of organs is usually a slow process, which comes at the end of an illness and not at its commencement. In spite of this patent fact the practice of medicine is mainly concerned with the disease of organs. This is to say, when there are deviations from the normal and a physician is consulted the tendency is to suspect and look for advanced disease of organs, when in many cases the organs are sound.

Sir James Mackenzie and his disciples insist that the rational treatment of disease consists in preventing it from developing. And this must be effected by early diagnosis, by detecting symptoms even

before they have taken shape, and suppressing them before they have had the opportunity of making themselves troublesome. Moreover, it is pointed out that the general practitioner being the only man who can detect early symptoms, because he is the one who has the chance of observing them, must be taught how to diagnose the very earliest symptoms of disease. Of course, it is immensely difficult thus to diagnose, for the reason that it is a task of the greatest magnitude to teach the general practitioner how to do it. He must understand the new research work into the earliest signs of disease. Sir James Mackenzie and his coadjutors have taught him to begin to do so and the reports of the St. Andrew's Institute of Clinical Research supply remarkable testimony to the value of his efforts.

THE CANCER SITUATION.

There is no disease which afflicts mankind, and especially the civilized portion, which arouses such great dread as malignant disease in its several forms. It is truly a terrible malady and one which for many reasons does not admit, in too many instances, of effective treatment. As a rule, except in certain cases in which the manifestations are superficial, the disease has made such progress before diagnosis is made and aid given, that medical science can do little even for the relief of the patient. In the early stages and if the locality in which the tumor is situated is favorable for surgical intervention cures are sometimes made and, in any event, life is frequently greatly prolonged; but unfortunately the diagnosis of malignant growths in their early stage is not made as often as is desirable.

So far as the origin of cancer is concerned research in this direction has been busy for many years and occasionally it has seemed that we were on the eve of solving the mystery. But little has come of the earnest and enthusiastic labors of scientists in all parts of the world, except that some of the paths traversed appear to have been blind alleys and the field of research has been narrowed considerably in consequence. In this country, perhaps, more is being done in the attempt to determine the cause of cancer than anywhere else, and money has been forthcoming freely in order that research may be prosecuted under the most favorable auspices. All this energy, time and money expended without stint augurs success in the final result, although it may be long in coming.

A notable collection of articles by authorities on the subject of cancer appeared in the April 5, 1922, issue of the *Medical Press*, London. Sir Arbuthnot Lane dealt with the relation to cancer of alimentary toxemia, arising from long continued

intestinal stasis, and suggested that such a poisoning might be an exciting cause of the disease in those who were predisposed. He believes, unlike others who have studied the question, that cancer is essentially a malady of civilized life brought about largely by excessive eating and by eating food not adapted to man's requirements. He points to Colonel McCarrison's evidence concerning natives of India, that as long as they consume simple food and lead a simple life generally, they are free from malignant affections, but that when they become prosperous and copy the food and the habits of the white man they suffer in the same way as he suffers. He insists, in short, on the necessary causal relationship between chronic intestinal stasis and all forms of cancer, other than the cutaneous varieties, which are obviously produced by heat or by some definite mechanical or chemical irritant. Logically, therefore, the great English surgeon argues that cancer is, at least to a great extent, a preventable disease.

Sir John Bland-Sutton contributed an article on the microflora of cancer and appeared to favor somewhat the theory that cancer was of parasitic origin, emphasizing in support of this theory the proneness of cancer formations to undergo bacillary invasion. Sir G. Lenthal Cheate, who has done splendid research work on the pathology of breast cancer, discussed in a thoughtful and able article the question of its endogenous and exogenous causation from the viewpoint of irritation. Also, he gave as his opinion that the internal secretions must be regarded as of immense importance in the study of any form of growth including cancer. Dr. W. S. Lazarus-Barlow dealt with radium treatment of malignant disease in an illuminating but restrained manner. He drew attention to one result from radium treatment, not immediately obvious, which he believed would be of real benefit to the patient. This was that the fear of operation was so real to the public and the belief that cancer meant an operation was so universal, that patients often deferred seeking medical advice until the growth was inoperable. As soon as men and women began to realize that an abnormal condition in themselves which they feared might turn out to be a cancer did not necessarily mean a surgical operation, it was probable that they would seek medical advice earlier.

Dr. J. A. Shaw-Mackenzie discussed cancer therapy in relation to physiological research in a very suggestive manner. Dr. Reginald Morton contributed an article in which he proclaimed his belief in and enthusiasm for the Erlangen technic of the x ray treatment of malignant disease. His faith was founded not only on what he had seen in Germany, but on the results he himself had obtained

by the method in this country. Mr. E. G. Slesinger further developed the thesis of Sir Arbuthnot Lane that intestinal stasis exerted a very important influence upon the evolution of cancer, and suggested that the relief of intestinal stasis might be a means for preventing malignant disease. Mr. Percy Dunn, a well known surgeon and an editor of the journal in which the articles quoted above appeared, was mainly responsible for the success of the issue. He reviewed the past and the existing situation as regards cancer in an interesting way. The number is well worthy of close consideration from all points of view.

PROPER CREDIT.

Dr. Sydney Wallenstein, of Baltimore, Md., calls our attention to the fact that in his article on The Interpretation of the Wassermann Reaction, published in our issue for May 3d, p. 514, he inadvertently omitted to give proper credit to Dr. Charles F. Craig for the quotations which appear in this article from Dr. Craig's book on *The Wassermann Test*. Dr. Wallenstein wishes it to be clearly understood that this omission was merely an oversight and wholly unintentional.

News Items.

Southern Minnesota Medical Association.—The midsummer meeting of this association will be held at Rochester, Minn., June 19th and 20th, under the presidency of Dr. W. F. Braasch. The program for the forenoon sessions will consist of clinics and demonstrations at the leading hospitals and the afternoons will be devoted to the reading and discussion of scientific papers. Dr. Aaron F. Schmitt, Physicians and Surgeons Building, Minneapolis, is secretary general.

Congress on History of Medicine.—The Third International Congress of the History of Medicine will be held in London, July 17 to 22, 1922, under the presidency of Charles Singer, M. D., D. Litt. J. D. Rolleston, M. D., is general secretary and those who desire further information concerning the congress should communicate with him. His address is 21 Alexandra Mansions, King's Road, London, S. W. 3. Lieutenant Colonel Fielding H. Garrison, M. C., United States Army, is official delegate from the United States.

National Tuberculosis Association.—The eighteenth annual meeting of this association was held in Washington, D. C., May 4th, 5th and 6th, under the presidency of Dr. James Alexander Miller, of New York. Officers for the ensuing year were elected as follows: Dr. Lawrason Brown, of Saranac Lake, president; Dr. C. J. Hatfield, of Philadelphia, first vice-president; Dr. J. W. Pettit, of Ottawa, Ill., second vice-president; Dr. G. M. Kober, of Washington, D. C., secretary; Dr. H. V. Platt, of New York, treasurer. Dr. Linsly R. Williams, of New York, has been appointed managing director.

St. Mark's Hospital Alumni Association.—At a meeting of this association held at St. Mark's Hospital on Wednesday, April 26th, the following officers were elected: President, Dr. Charles N. Gelber; vice-president, Dr. Frank Tannenbaum; secretary, Dr. I. Glassman; treasurer, Dr. J. Jusko-witz; executive committee, Dr. Charles Meinhardt, Dr. M. F. Goldberger, Dr. J. Lewis Amster, Dr. Philip Goldfader and Dr. Jacob Silver.

Technical Photographic and Microscopical Society.—Permanent organization of this society was effected at a meeting held at the Chemists' Club, New York, on Wednesday, May 10th. It is planned to hold a general convention of industrial and microscopical photographers in connection with an exhibition of photographic work, chemicals, and apparatus, which will be held at the Grand Central Palace, during the National Exposition of Chemical Industries, September 11th to 16th.

American Laryngological Association.—Dr. Emil Mayer, of New York, was elected president of this association at the forty-fourth annual meeting held in Washington, D. C., May 1st and 3d. Other officers elected were: Dr. George Fetterolt, of Philadelphia, first vice-president; Dr. Lorenzo B. Lockard, of Denver, second vice-president; Dr. George M. Coates, of Philadelphia, secretary; Dr. Joseph H. Bryan, of Washington, D. C., librarian; Dr. Joseph Payson Clark, of Boston, treasurer.

Brooklyn Cardiologistical Society.—The final meeting for the season of the Brooklyn Cardiologistical Society was held at the residence of the president, Dr. William J. Cruikshank, Wednesday evening, May 31st. The paper of the evening was read by Dr. Selian Neuhof on Pregnancy and Heart Diseases. The discussion was opened by Dr. Harold E. B. Pardee and continued by Dr. John O. Polak and Dr. Ralph H. Pomeroy. A general discussion followed which brought out many interesting points.

Personal.—Dr. Thomas Darlington, of New York, was elected president of the American Association for Promoting Hygiene and Public Baths, at the annual meeting of this organization held in Buffalo, N. Y., May 11th and 12th. Dr. Darlington succeeds Dr. Simon Baruch, who died on June 3, 1921.

Dr. Stephen E. Tracy has been elected president of the Obstetrical Society of Philadelphia.

Dr. Louis M. Warfield has been appointed professor of internal medicine at the University of Michigan Medical School, Ann Arbor.

Dr. Harry Vinn Arny, professor of chemistry in the College of Pharmacy, Columbia University, has received the third award of the Remington Honor Medal.

Dr. Francis X. Mahoney has been appointed health commissioner of Boston, to succeed Dr. William C. Woodward, who resigned recently after serving in that capacity since August 1, 1918.

Colonel Henry Page, dean of the Medical School of the University of Cincinnati, and Professor A. P. Mathews, with forty members of the graduating class, were entertained at luncheon by Mr. Charles G. Merrell, president of the William S. Merrell Company, at the Hotel Gibson on May 23rd.

Government Needs Dietitians and Aides in Rehabilitation of Disabled Veterans.—The United States Civil Service Commission states that there is urgent need at hospitals of the United States Public Health Service and establishments of the United States Veterans' Bureau for dietitians and reconstruction aides in physiotherapy and occupational therapy in connection with the rehabilitation of disabled soldiers, sailors and marines. Full information concerning salaries and requirements, and the proper application blanks, may be secured from the United States Civil Service Commission, Washington, D. C.

Associate in Clinical Psychiatry and Psychotherapy.—The United States Civil Service Commission announces an examination for associate in clinical psychiatry and psychotherapy to fill vacancies at St. Elizabeth's Hospital, Washington, D. C., at \$2,500 a year, and in positions requiring similar qualifications, at this or higher or lower salaries. The duties of the appointee will be to act as consultant to the different medical services of the hospital. It is desired to secure the services of a person familiar with the modern therapeutic movements in the practice of mental medicine. Applications will be rated as received until July 31, 1922.

American Gynecological Society.—At the annual meeting of the American Gynecological Society, held in Washington, D. C., May 1st, 2nd and 3rd, the following officers were elected for the ensuing year: President, Dr. John A. Sampson, of Albany, N. Y.; first vice-president, Dr. Brooke M. Anspach, of Philadelphia, Pa.; second vice-president, Dr. Frank W. Lynch, of San Francisco, Cal.; secretary, Dr. Arthur H. Curtis, of Chicago, Ill.; treasurer, Dr. Charles C. Norris, of Philadelphia, Pa. Other members of the council: Dr. George Gray Ward, Jr., of New York; Dr. Walter W. Chipman, of Montreal; Dr. Robert L. Dickinson, of New York; Dr. Franklin H. Martin, of Chicago; Dr. R. R. Huggins, of Pittsburgh, Pa.; Dr. Le Roy Broun, of New York.

American Society of Tropical Medicine.—At the eighteenth annual meeting of the American Society of Tropical Medicine held on May 2d and 3d, in Washington, D. C., in conjunction with the Congress of American Physicians and Surgeons of which the society is one of the component organizations, a program of twenty-one papers was presented, the sessions being attended by over sixty members and visitors. Fifty-five new active members and five new corresponding members were elected. The annual meeting for 1923 is to be held at or about the time of the meeting of the American Medical Association in Atlantic City, N. J. The following officers were elected: President, Dr. George Dock, of St. Louis, Mo.; first vice-president, Dr. Sidney K. Simon, of New Orleans, La.; second vice-president, Dr. Joseph F. Siler, of United States Army; secretary and treasurer, Dr. Brayton H. Ransom, of Washington, D. C.; assistant secretary, Dr. Allen J. Smith, of Philadelphia, Pa.; councillor for five years, Dr. Kenneth M. Lynch, of Dallas, Tex.; councillor for one year, Dr. George C. Shattuck, of Boston, Mass.

Brooklyn Ophthalmological Society Organized.—At a called meeting held on May 9, 1922, in the Library Building of the Medical Society of the County of Kings the Brooklyn Ophthalmological Society was organized. The officers elected were: President, Dr. Joseph E. Golding; vice-president, Dr. Ralph I. Lloyd; secretary-treasurer, Dr. Willis M. Gardner. Dr. James W. Ingals and Dr. Henry M. Smith were elected to form with the officers the executive committee. Membership is limited to oculists resident on Long Island. Dues are five dollars a year and meetings will be held bimonthly in October, December, February and April. An annual meeting and dinner will be held in May at which will occur the election of officers.

The Society of Cinematographic Instruction in Medicine and Surgery.—After two years of preliminary experiments and organization work, the society is now an established and incorporated body and has the support of the leading members of the profession. The purpose for which the society was founded was to raise the science of cinematography in its application to medicine and allied subjects, entirely out of the field of commercialism. In this manner it is possible to make this valuable adjunct to teaching immediately available to the individual physician, surgeon and dentist, as well as to institutions which have recognized and taken into account this new factor of actual visualization in connection with the teaching of medicine and allied subjects. The executive office of the society is situated at 105 West Seventy-third Street, New York, and the following officers are in charge: Dr. James S. Edlin, president; Dr. R. Ottolengui, vice-president; Dr. Charlton Wallace, vice-president; Dr. Alfred Kahn, secretary; Dr. Maximilian Lewson, treasurer; Dr. Robert L. Winkley, executive assistant. The inaugural meeting was held on Friday, April 28th, at the New York Academy of Medicine. An interesting program was presented.

Died.

BARIGHT.—In Saratoga Springs, N. Y., on Saturday, May 27th, Dr. Herbert Edwin Baright, aged fifty-four years.

BROWD.—In New York, on Tuesday, May 16th, Dr. Ephraim K. Browd.

CHILDS.—In Paterson, N. J., on Wednesday, May 24th, Dr. John H. Childs, of New York, aged forty years.

CLAIBORNE.—In New York, on Saturday, May 27th, Dr. J. Herbert Claiborne, aged sixty years.

DAY.—In Dexter, England, on Wednesday, May 10th, Sir Henry Day.

DE NOYELLES.—In Albany, N. Y., on Tuesday, May 23rd, Dr. P. Lawrence De Noyelles, aged twenty-eight years.

MAYNARD.—In Nyack, N. Y., on Monday, May 8th, Dr. Edward H. Maynard, aged seventy-four years.

ROY.—In New York, on Wednesday, May 10th, Dr. Frank Austin Roy, aged sixty-four years.

SHORTLE.—In Albuquerque, N. M., on Friday, May 26th, Dr. Abraham G. Shortle, aged fifty-one years.

WYETH.—In New York, on Sunday, May 28th, Dr. John A. Wyeth, aged seventy-seven years.

Book Reviews

DISEASES OF DIGESTIVE TRACT.

Diseases of the Digestive Organs. With Special Reference to Their Diagnosis and Treatment. By CHARLES D. AARON, Sc.D., M.D., F.A.C.P., Professor of Gastroenterology and Dietetics in the Detroit College of Medicine and Surgery. Third Edition, Thoroughly Revised. Illustrated with One Hundred and Sixty-four Engravings, Forty-eight Röntgenograms, and Thirteen Colored Plates. Philadelphia and New York: Lea & Febiger, 1921. Pp. 904.

This third edition of Aaron's well known work on disorders of the digestive tract contains many improvements on previous editions. It is a complete and trustworthy guide to the diagnosis and treatment of some of the most perplexing and trying of all the diseases which the general practitioner is called upon to treat. A number of excellent illustrations have been added and in the text a considerable amount of new material has been incorporated, necessitated by the recent advances in the science of gastroenterology.

X RAYS IN GASTRIC DISEASE.

Die Röntgendiagnostik der Magenkrankheiten. Von Privat-Dozent Dr. M. FAULHABER, Würzburg. Dritte vermehrte und verbesserte Auflage. Von Dr. L. KATZ, Berlin-Wilmersdorf. Mit 51 Abb. im Text und auf 2 Tafeln. Halle a.S.: Carl Marhold, Verlagsbuchhandlung, 1922. Pp. 112.

This monograph gives an excellent account of the importance of x rays in the diagnosis of diseases of the stomach. With regard to gastric ulcer Faulhaber expresses himself as follows: "The x ray examination cannot show each case of gastric ulcer, nor is it permissible to exclude the presence of a gastric ulcer on account of a negative finding by the x rays." "The positive signs of gastric ulcer by the x rays are the direct signs, and these are encountered in the minority of cases." "Only the deep, far progressed ulcer can be directly demonstrated by the x rays." . . . "The superficial ulcer is either not discoverable at all or can be assumed as probable by indirect signs." The direct sign of ulcer is Haudek's niche. The book is very practical and is herewith highly recommended.

MECHANICS OF DIGESTION.

The Mechanics of the Digestive Tract. By WALTER C. ALVAREZ, M.D., Assistant Professor of Research Medicine, George Williams Hooper Foundation for Medical Research, University of California Medical School. With Twenty-two Illustrations. New York: Paul E. Hoeber, 1922. Pp. xii-192.

The book contains a study of the differences in irritability of the various parts of the digestive tract. Alvarez noticed, while working on the absorption of gases after their injection into loops of the intestine, that there were differences in irritability in the different parts of the bowel. Thus the jejunum reacted more intensely and promptly than the ileum. To this difference in irritability in a graded way from one end of the digestive tract to the other Alvarez ascribed the downward progress of food in the bowel. It seemed reasonable to assume that material would have to move from the more irritable and active regions to the less irritable and active ones.

These differences of irritability Alvarez showed in excised segments of the stomach and intestines and found that the rate of rhythmic contraction of the muscles is graded downwards from the pylorus to the ileocecal sphincter. He believes that the peristaltic action of the intestines is a result of the graded rate of the rhythmic contraction of the muscles and is controlled secondarily by the different nerve plexuses.

With regard to the stomach, Alvarez expresses himself as follows: "The muscle of the lesser curvature near the cardia is soft to the touch like coagulated fibrin; that in the pyloric antrum is tough like gizzard and has a different color. If we stimulate the two with an electric current or with a pinch, we get two entirely different contraction curves; and if we put them into warm oxygenated Locke's solution we get two different types of rhythmic activity. These differences should be expected when we remember that the upper and lower ends of the stomach have different kinds of work to do. The upper end serves largely as a hopper to hold the food; the lower as the mill to do the heavy work."

Vomiting, belching, regurgitation, heartburn, nausea, coated tongue and foul breath are all ascribed to disturbances of the right gradient and to some retroperistaltic waves. The book contains a great deal of original material, is of great interest, and can be recommended.

VITAMINES AND FOOD SUPPLY.

The Vitamines. By H. C. SHERMAN, Professor of Food Chemistry, Columbia University, and S. L. SMITH, Specialist in Biological and Food Chemistry, United States Department of Agriculture, American Chemical Society Monograph Series, New York: The Chemical Catalog Company, Inc., 1922. Pp. iii-273.

The volume under review was written for the purpose of summarizing the present knowledge of the chemical nature of vitamins in as judicious a manner as possible. The authors show little sympathy with the scientist who refrains from an endeavor to appraise the importance of vitamins until they have been separated in pure condition. They express the hope that the present work may do something to stimulate quantitative research as distinguished from the merely qualitative tests which have now largely served their purpose, and at the same time that it may serve to present the chief facts not known in such a way as to show their true significance and avoid exaggerated impressions.

Though the larger part of the work was written early in 1921, certain parts have been brought down to the end of that year. There are five chapters, covering over two hundred pages of text, in addition to which there is a bibliography of about a thousand titles. The chapter on vitamins in the problem of food supply, is most instructive and interesting, even to the layman, who can read this chapter with much profit. On the whole, the authors have produced a most readable work which covers this important subject fully and entertainingly. The key to the work may be found in the concluding statement of the authors that they believe

that with a dietary selected to make the best use of our ordinary staple foods there will rarely, if ever, be occasion to purchase vitamins in any other form, or to give greater anxiety to the vitamins than to some other factors which enter into our present conception of nutritive requirements and food values." Because of their sane and conservative attitude toward the problem of the vitamins, this work may be recommended as a safe guide in the study and practical application of the problems involved in our food supply.

HEMOLYTIC ICTERUS.

Pathologie und Therapie des hämolytischen Ikterus. Von Prof. Dr. M. Mosse, Berlin. Halle a. S.: Carl Marhold, Verlagsbuchhandlung, 1921. Pp. 50.

Mosse gives a detailed description of hemolytic icterus. The family or congenital type represents the mildest form of this disease. The spleen is by some clinicians held responsible for the development of hemolytic jaundice, as this organ is usually considerably enlarged and diseased in this form of the disease. Splenectomy has frequently effected a cure. The monograph can be highly recommended.

SURGICAL CLINICS.

The Surgical Clinics of North America. Philadelphia Number. Volume II, No. 1. With One Hundred and Forty-five Illustrations. Philadelphia and London: W. B. Saunders Company, 1922. Pp. 331.

In this issue of the *Surgical Clinics*, the publishers have once more earned the thanks of the medical profession for the most interesting and useful volume which they have brought forth. Eighteen Philadelphia surgeons are represented in these clinics. A. P. C. Ashhurst presents nine cases of unusual interest, J. B. Deaver six cases, described in his inimitable manner, and the other clinics are no less attractive both in substance and in manner of presentation. The illustrations are of high quality and in large numbers, combining to make this an excellent addition to the preceding series. We feel that the publishers are performing a distinct service and deserve much credit for the publication of these *Clinics*.

MEDICAL CLINICS.

The Medical Clinics of North America. Volume V: Number 2, Mayo Clinic Number, September, 1921; Number 3, Philadelphia Number, November, 1921. Philadelphia and London: W. B. Saunders Company, 1921.

In the September number there are contributions from eighteen members of the staff of the Mayo Clinic. Carman has an unusually long article on primary cancer of the lung that discusses the subject principally from the viewpoint of the röntgenologist. Wilder presents an interesting classification of types of diabetes mellitus. Benedict discusses the retinitis of acute nephritis. Sanford has a brief paper on hypersensitivity to food proteins and Rosenow reaffirms his belief in the elective affinity of the streptococci and shows how that belief is justified. Other contributions are of only little less interest.

Twenty-five of the leading clinics of Philadelphia are represented in the November number. Sailer presents an instructive discussion of a number of instances of mistakes in diagnosis in abdominal conditions. Schamberg and Klauder give some of the results of their experience with Kolmer's new modi-

fication of the Wassermann reaction. Jackson shows several conditions in which the use of the bronchoscope was almost essential to diagnosis or treatment. It is impossible to mention all of the contributions but they present under each title some point of interest or value to the physician.

GOUT AND RHEUMATISM.

The Physiology of Gout, Rheumatism, and Arthritis. As a Guide to Accurate Diagnosis and Efficient Treatment. By PERCY WILDE, M.D., Physician to the Lansdown Hospital, Bath. New York: William Wood & Co., 1922.

This is a book very much out of the ordinary, in that it is full of novel ideas—or we might say a novel idea, since there is one fundamental theory that underlies all the subjects discussed—and one that starts the reader off on a new train of thought. The author says in his preface that he has no theories regarding gout, rheumatism and arthritis, but that is evidently because he regards his new views as facts, on a plane far above that of theory. He regards disorders of the arthritic class, including neuritis, not as diseases but as physiological observations, the fundamental error being a delayed or insufficient execution of the lactic acid and lactates formed as a result of muscular action or strain. Dr. Wilde has absolutely no use for the uric acid theory, this substance, as found in the various experiments and analyses, being as it was an artefact produced as a result of the various chemical reaction set up by the analyst. The theory (in spite of the author's confidence we must still regard it as a theory) is most interesting and its practical therapeutic application is simplicity itself. As to what this treatment is and how the author seeks to prove his theory we must refer the reader to the book itself; and we can assure him, whether or not he finally accepts the author's theories, he will be interested in the study of his propositions.

PHYSIOLOGY.

A Textbook of Physiology for Medical Students and Physicians. By WILLIAM H. HOWELL, Ph.D., M.D., Sc.D., LL.D., Professor of Physiology in the Johns Hopkins University. Eighth Edition, Thoroughly Revised. Philadelphia and London: W. B. Saunders Company, 1922.

The first edition of this standard treatise appeared in 1905 and since then at intervals of two or three years, new and revised editions have appeared. The casual student of physiology is likely to regard physiology as an independent science rather distantly related to practical medicine. Dr. Howell, however, insists that it is an essential basis of medical practice and especially of hygiene. He speaks with scorn, in his preface, of the present day works on personal hygiene which he says are in large part unscientific compilations serving mainly "to perpetuate baseless tradition or to disseminate the vagaries of infantile faddists." A critical scientific presentation of the subject is, he says, much needed. The reviewer agrees with him in the main and hopes that, convinced of the great need of a treatise on hygiene founded on pathology and physiology, Dr. Howell will himself undertake the task of preparing such a work. We would predict for it an even greater need of popular favor than the present volume has enjoyed.

PATHOLOGICAL PHYSIOLOGY.

Pathologische Physiologie. Ein Lehrbuch für Studierende und Aerzte. 1. Abteilung. Die Funktionsstörungen des Herzens, der Gefäße und des Blutes. Von Dr. H. E. HERING, o. Professor der Pathologischen Physiologie in Köln a./Rh. Leipzig: Georg Thieme, 1921.

Hering is constructing this new work on the basis of his lectures on the subject and is attempting to inject into it such demonstration of the clinical effect of disturbed physiology as to interest the clinician in the whole subject of pathological physiology. In this first section of the work he considers disturbances in heart action, in vessel action, and in the quantitative and qualitative changes which occur in some of the constituents of the blood. His mode of procedure is to present first the circumstances under which the changes occur and then to picture the results of these changes. It proves to be a very attractive arrangement of the subject and the author's great experience has enabled him to express himself with conciseness and clarity. It promises to be an interesting and valuable work.

DISEASES OF PERIPHERAL NERVES.

Surgical and Mechanical Treatment of Peripheral Nerves. By BYRON STOOKEY, A.M., M.D., Associate in Neurology, Columbia University; Assistant Surgeon, New York Neurological Institute; Assistant Professor of Neurosurgery, New York Post-Graduate Medical School and Hospital. With a Chapter on Nerve Degeneration and Regeneration, by G. CARL HUBER, M.D., Professor of Anatomy and Director of Anatomical Laboratories, University of Michigan. With Two Hundred and Seventeen Illustrations, Eight in Color, and Twenty Charts. Philadelphia and London: W. B. Saunders Company, 1922. Pp. 475.

Seldom is a book of so special a character treated in so broad a way. Most books written on a highly individual surgical topic consider the mechanical situations, while Stookey emphasizes the functional and developmental portions of the nervous system. In addition there are so many ingenious methods detailed that there is little room for adverse criticism of this admirable book. The topic is presented in a pleasing style and the illustrations are all that could be desired.

HYGIENE FOR THE HOUSEWIFE.

Hygiene of Women and Children. By JANET E. LANE-CLAYTON, M.D., Sc. (Lond.), Dean and Lecturer on Hygiene in the Household and Social Science Department, King's College for Women; Justice of the Peace; Formerly Medical Inspector under the Local Government Board. Oxford Medical Publications. London: Henry Frowde and Hodder & Stoughton, 1921. Pp. xvii-354.

This book is intended to meet the needs of nurses, health visitors, and other sanitary workers, and particularly to educate the housewife. A book of this kind must necessarily contain much that is trite but the author has endeavored to pass over in a cursory way information which is easily obtainable in order to bring out points not so readily accessible. Though a chapter on sanitary housing is included in the volume, emphasis is laid on individual and personal hygiene, which the writer believes people find most difficult to practice. The major portion of the book is given up to an exposition of up to date ideas on foods and feeding culled from the medical literature. Milk, its composition, production and supply, standards of purity, heating and care in the home, are

discussed at length. Tables are given showing the cost and caloric value of various foodstuffs. Chapters are also included on the artificial feeding of infants, rickets and scurvy, and growth and growth factors in infancy and childhood. The print is good, the text is not difficult reading, and the interest is considerably enhanced by seventy-one illustrations.

PSYCHOANALYTICAL SKETCHES.

Disguises of Love. Psychoanalytical Sketches. By W. STEKEL, Neurologist and Psychotherapist, Vienna. Authorized Translation by ROSALIE GABLER. New York: Moffat, Yard & Co., 1922. Pp. vi-171.

The blending of the poet and the scientist is a rare occurrence, yet not unknown. It would be fortunate if Stekel were more of a poet or more of a scientist. He has taken some of the most valuable of Freud's findings and encircled them, even submerging them, with a copious use of words. The use of many words, more or less well chosen, does not make a poet. The advantages of Stekel's position are that the poets may say "As a poet he is not good, perhaps he is a great scientist"; the scientist will say "I know nothing of his value as a poet, but his scientific findings are not sound." The book has many suggestions of value but on the whole there are many works on psychoanalysis which are far more fundamental in character and less misleading.

FAMILY LIFE.

Intrusion. By BEATRICE KEAN SEYMOUR, Author of *Invisible Tides*. New York: Thomas Seltzer, 1922. Pp. 329.

Just to take a single instance of the ever-shifting satire of life, we have this powerful novel by Beatrice Kean Seymour. A family of intellectuals is pictured—all highly sensitized, refined to an almost neurotic degree. They are natural enough, universal even, especially in their secret admiration of the one frankly unreined and uninhibited member of the family, the darling reprobate, Jan. Before the actuality of him their world of ideas, resolves and dreams fades. He represents success; they cannot resist him. Even his shade broods over the complicated state of affairs that he leaves behind him, controlling all the characters unconsciously.

Perhaps that is why the conscious realization of the intruder, Roberta, is so difficult for the family. There is the inevitable mismating between her and Jan's writer brother, a poor substitute for Jan; the inevitable struggle on the part of the family to stand by each other and accept Roberta. And there follows also the inevitable and gradual insinuation of Roberta into the private affairs of all the other members of the family. She is disastrous; not because she is common but because she is stupid. Stupid not in the sense of dull or uninteresting—she is anything but that—but in the sense of being totally unattuned to the myriad highly sensitized currents of the life into which she has been projected. The characters, Allan, Roberta's husband, Guen, his writer sister, Carryl, the youthful idealist, and the carefree, daredevil, Jan, are all vivified to a remarkable degree. They act and think and talk like real people and face or shrink from their problems as any one of us might.

Medicoliterary Notes.

Prof. Edward L. Thorndike has in the May number of *Harper's* an interesting article on the *Psychology of Labor*.

* * *

The Connaught Antitoxin Laboratories, of the University of Toronto, have recently published the first volume of a series of studies, which will appear from time to time, embodying the results of investigations of the staff of the laboratories and the department of hygiene and preventive medicine of the university. Among contributors to this volume are J. G. Fitzgerald, D. E. Robertson, A. H. W. Caulfield, D. T. Fraser, P. J. Moloney, L. O. Hanna, R. D. Defries, W. R. Hodge, C. Cohen and G. E. Richards.

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The Eye, Ear, Nose and Throat Monthly is the name of a new journal published in Chicago, the first number of which appeared recently. The editors state that the magazine is primarily for the benefit of "the man in the field." Dr. Thomas G. Atkinson is editor. Among contributors to the number are Dr. John F. Barnhill, Dr. T. F. Dimitry, Dr. Harold Hays, Dr. Robert H. Good, Dr. G. Henry Mundt, Dr. Edward R. Newton, Dr. Oscar Frank Baerens and Dr. L. Herbert Lanier.

* * *

The forty-sixth annual report of the New Jersey Hospital at Morris Plains, for the year ending June 30, 1921, has just been issued. Emphasis is laid upon the immediate necessity of relieving the overcrowded condition of the institution. At the close of the year covered by the report the books showed an increase of fifty-nine patients over the preceding year, the greatest increase for any year since 1914-1915; discharges totalled 324 and deaths 280.

* * *

An interesting experiment is being tried out in the St. Louis schools. After preliminary tests and studies, ozone machines have been installed in the air ducts of several of the school buildings. In most cases the teachers were not told of the change in the ventilating systems so that their mental attitudes could not affect results. The most beneficial effects were noticeable in a few weeks. Teachers volunteered the information that pale and anemic children had gained in weight and that the fatigue of the day's work had been markedly relieved.

* * *

Youth Grows Old, a book of poems by Robert Nathan, published in 1922, follows in spirit his brief novel *Autumn* which came out last year. The central figure of the latter is "Mr. Jeminy," a gentle, lovable, old philosopher schoolmaster in a small New England village. Mr. Nathan's style is his chief asset. Its simplicity, directness and naturalness are a welcome relief and pleasure after the forced striving after effect and sensation that mark so much of our modern writing.

* * *

Modern Men and Mummies, the title of Hasketh Pearson's new book, is descriptive of the contents. The sketch of George Bernard Shaw is the best. The author reminds us in his account of the great

eugenist, Sir Francis Galton, that the latter was the real originator of the theory of detecting criminals by their fingerprints and suggested to Bertillon that he should make a practical application of this theory in his work.

* * *

The *American Journal of Public Health* for April contains reports of two interesting symposia held at the fiftieth annual meeting of the American Public Health Association in New York city last November. The subjects were Motion Pictures, and How to Further Progress in Health Education and Publicity.

New Publications Received.

COLLECTED POEMS. By EDWIN ARLINGTON ROBINSON. New York: The MacMillan Company, 1921. Pp. xi-592.

UP STREAM. An American Chronicle. By LUDWIG LEWISOHN. New York: Boni & Liveright, 1922. Pp. 248.

THE OTHER MAGIC. A Romance of the Tropics. By E. L. GRANT WATSON. New York: Alfred A. Knopf, 1921. Pp. 275.

PSYCHOANALYSIS IN THE SERVICE OF EDUCATION. By DR. OSKAR PFISTER. New York: Moffat, Yard & Co., 1922. Pp. x-176.

SPIRITISM AND THE CULT OF THE DEAD IN ANTIQUITY. By LEWIS BAYLES PATON, Ph.D., D.D. New York: The MacMillan Company, 1921. Pp. ix-325.

BASAL METABOLISM: ITS DETERMINATION AND APPLICATION. Edited by FRANK B. SANBORN, M.S. First Edition. Boston: Sanborn Company, 1922. Pp. 282.

SOLUTIONS IN TEN LESSONS. A Manual for Use in Training Schools for Nurses. By ELSIE M. SMITH, R.N. Second Revised Edition. St. Louis: C. V. Mosby Company, 1922. Pp. 59.

DOMICILIARY TREATMENT OF TUBERCULOSIS. By F. RUFENACHT WALTERS, M.D., B.S., M.R.C.P. (Lond.), F.R.C.S. (Eng.). New York: William Wood & Co., 1921. Pp. xii-290.

DIAGNOSTIC, TRAITEMENT ET EXPERTIS DES SEQUELLES OCULO-ORBITAIRES. Par le Dr. F. TERRIEN. Preface par le Pr. A. GILBERT. Avec 67 figures dans le texte. Paris: Librairie J. B. Balliere et Fils, 1921. Pp. 276.

A HALF CENTURY OF PUBLIC HEALTH. Jubilee Historical Volume of the American Public Health Association. Edited by MAZUCK P. RAVENAL, M.D., President. New York: American Public Health Association, 1921. Pp. xi-461.

THE PSYCHOANALYTICAL STUDY OF THE FAMILY. By J. C. FLUGEL, B.A. The International Psychoanalytical Library, No. 3. London, Vienna, and New York: The International Psychoanalytical Press, 1921. Pp. x-259.

TECHNIQUE DE LA REACTION DE DEVIATION DU COMPLEMENT DE BORDET ET GENGOU. Avec utilisation speciale de la methode de Calmette et Massol. Par P. F. ARMAND-DELILLE and L. NEGRE. Deuxieme edition. Paris: Masson et Cie, 1922. Pp. 194.

THE PRACTICAL MEDICINE SERIES. Volume VII: Skin and Venereal Diseases. Edited by OLIVER S. ORMSBY, M.D. Volume VIII: Nervous and Mental Diseases, Edited by PETER BASSOE, M.D. Series 1921. Chicago: The Year Book Publishers, 1922.

ÜBER TUBERKULOSE IM MITTELSTAND NEBST VORSCHLÄGEN ZU EINER ERWEITERUNG DER BEKÄMPFUNGSMASSNAHMEN. Von Dr. med. CARL BREUL. Mit sechs Übersichten und einer Epikrise. Tuberkulose-Bibliothek. Beilhefte zur Zeitschrift für Tuberkulose, herausgegeben von Prof. Dr. LYDIA RABINOWITSCH. Nr. 6. Leipzig: Verlag von Johann Ambrosius Barth, 1922. Pp. 64.

Practical Therapeutics

THE NEW AND DIRECT METHOD OF TREATING CATARRHAL JAUNDICE.

Comparative Value of the Old and the New Methods Based on a Study of Thirty-one Cases.

By ARTHUR H. HOPKINS, B. S., M. D.,
Philadelphia.

There is a difference of opinion with regard to the value of the new and the old methods of treating acute catarrhal jaundice. The results derived from the study of these cases are presented with the idea of contributing to our information on the subject and with the realization that it will require contributions of others, along the same line, before we may be convinced of the greater efficiency of one or the other method.

By the new method of treatment I refer to the Meltzer-Lyon method of so-called gallbladder drainage in which fifty c. c. of a twenty-five per cent. solution of magnesium sulphate is introduced into the duodenum by means of the duodenal tube, and after which the duodenal contents are drained by siphonage or gently aspirated.

The object of this treatment is to relax the sphincter in the papilla of Vater and thus permit of a freer flow of bile from the gallbladder, owing to a lessening of the obstruction in the region of the ampulla, where, owing to congestion, swelling, edema and increased mucous formation, the bile outlet into the duodenum has been rendered less patulous. The theory of relaxation of the sphincter by this means I believe is not disputed but the same cannot be said with regard to the action of the drug in contracting the gallbladder.

The new method of treatment, then, has to do with duodenal intubation and the application of a drug or drugs to the duodenal mucosa direct. With this is combined the general management which is similar to the old, namely, rest in bed, skimmed milk diet, water freely, the alkalies and bismuth, etc., as indicated.

With the new method an enema may be resorted to every other day for constipation, while in the old method the custom was to administer orally calomel followed by magnesium sulphate. A survey of these cases reveals that there was no hard and fast rule followed, other than the use of these drugs at the outset and occasionally their repetition in a few instances, during the course of the disease.

The cases studied were under observation and treatment at the University Hospital. They will be divided into two groups: Group I representing eighteen patients treated entirely by the old method; Group II consisting of thirteen patients treated by the new.

Group I.—A brief summary of these cases shows that the disease was ushered in by gastrointestinal symptoms in eleven instances, by respiratory or infectious symptoms, such as coryza, cough, fever and chills in five instances, while twice the first manifestation was jaundice. Marked weakness was a prominent symptom in nearly every case.

All were typical, uncomplicated cases of catarrhal

jaundice. The pulse was characteristically slow, the fever low in five cases, absent in the rest, at least during their stay in the hospital. Six of the eighteen revealed a leucopenia, with a relative lymphocytosis, and in the majority the blood pressure was subnormal.

The results of the old method of treatment used in this group probably will be best illustrated by the accompanying table.

TABLE I.
SHOWING DURATION OF ILLNESS OF EIGHTEEN PATIENTS TREATED BY THE OLD METHOD.

Case No.	Name	Age Years	Number of days ill before admission	Number of days in hospital	Number of days actually jaundiced.
1	A. G. B.	23	42	8	**
2	R. F. C.	21	6	5	10
3	L. P. G.	29	16	9	29
4	P. N.	34	21	14	27
5	P. E. A.	27	15	17	8
6	W. H. O.	33	8	35	15
7	P. V.	26	9	25	13
8	J. M. E.	20	10	7	9
9	E. H. S.	18	14	8	22
10	T. S. F.	23	8	14	8
11	K. H. L.	24	6	4	**
12	J. H.	16	11	3	11
13	J. J. B.	20	4	9	46
14	E. F.	30	56	11	15
15	M. M.	20	6	15	15
16	P. L.	27	11	7	13
17	J. A. S.	29	4	9	**
18	J. B.	47	12	9	
Averages		Years 25	Days 14	Days 11	Days 17
*Female.					
**Indefinite.					

The averages thus revealed two factors. First, the average duration of illness before admission to the hospital, together with the average time spent in the hospital, was twenty-five days or nearly four weeks. Second, where a definite history could be elicited with reference to the actual jaundice, its duration was found to be seventeen days. Cases I, IV, VI and XIV were unusually prolonged. So much for this group of cases treated by the old routine methods.

Group II.—A summary of the group of thirteen cases treated by the new method shows the disease to have been ushered in by gastrointestinal symptoms in five cases, in three of which a definite history of dietary indiscretion was elicited as a probable causative factor. In five other cases the onset was characterized, first, by acute respiratory symptoms and followed shortly by gastrointestinal disturbances. In three cases general malaise and chills ushered in the disease. Weakness was also a frequent complaint in this series of cases. In this group fever was low or absent in most instances. The pulse was slow and blood pressure frequently below normal. Leucopenia was noted in three cases and a relative lymphocytosis in two.

The technic employed was as follows: At 7 a. m. the fasting patient was given the tube, the gastric residuum removed and the tube then permitted to work over into the duodenum. When properly done this, as a rule, can be accomplished within an hour. Any duodenal contents encountered were removed and then from fifty to sixty c. c. of a twenty-five per cent. solution of magnesium sulphate, warmed to body temperature, was introduced and the tube clamped for fifteen minutes. After that the clamp

was removed and siphonage of the duodenal contents was permitted until 1 p. m. when the tube was withdrawn and the skim milk diet given.

The following table illustrates the duration of the attacks and the influence of the new method of treatment upon the duration.

TABLE II.

Case No.	Name	Age	Number of days ill before admission	Number of days in hospital	Number of days actually jaundiced	Number of days required to relieve symptoms and clear jaundice by drainage
1	B. F. M.	22	5	11	7	7
2	S. G. T.	30	14	26	27	19
3	E. F. T.	20	4	7	8	6
4	G. H. K.	17	7	10	7	4
5	O. L.	21	7	14	12	7
6	M. J.	20	56	11	41	7
7	C. T.	22	9	13	7	6
8	R. R. R.	21	4	7	6	4
9	A. J. N.	29	3	6	14	3
10	V. S.	25	6	16	11	4
11	K. G. W.	22	3	12	10	9
12	A. C.	25	21	9	10	6
13	G. B. W.	21	7	9	7	5
Averages . . .			22½	11	12	6½

It will be seen from this table that the patients in this group were nearly the same average age as in Group I and that the course of the illness, until the tube treatment was started, ran parallel with regard to duration before admission to and time spent in the hospital. The duration of the jaundice, however, averaged twelve days in this group, against seventeen days in Group I where the old method of treatment was used.

The point, however, which should be emphasized particularly is the fact that an average of only six and a half days of drainage were necessary to clear the jaundice and it may be noted that in each instance after the first or second day of drainage the patients' gastrointestinal symptoms subsided rapidly and the appetite promptly returned. The urine became lighter and the stools darker usually on the third or fourth day.

It may be noted that frequently one and, at times, two or three days of intubation were necessary before a flow of bile could be established. In Case II, for instance, six days were required before bile could be recovered in spite of the fact that the fluoroscopic examinations revealed the tube in the duodenum. This patient was particularly resistant to treatment, and as he was very deeply jaundiced, and in view of the delay in recovering bile, it may be assumed that the congestion, edema, and swelling of the mucous membrane in the region of the ampulla was more than ordinarily severe.

Where prompt response was not derived from the magnesium sulphate solution and the tube was shown to be in position by the fluoroscope, I have found that the administration of calomel in one and a half to two grain doses by mouth, tended to produce quite a free, watery secretion which frequently and rapidly showed bile.

In view of the known action of calomel on the duodenal mucosa and its ability to produce a free watery secretion, it was administered to these patients by mouth whenever the magnesium sulphate action was retarded, and it is my impression that it was of distinct value in hastening results. A year ago I reported a few cases treated in this way, the technic being given in that report (1).

The suggestion may be made that the daily ad-

ministration of magnesium sulphate by mouth would have the same effect as though it were introduced by the tube. Meltzer has shown experimentally that if the magnesium sulphate is introduced into the stomach of dogs it does not have the same effect as when introduced directly into the duodenum. Further, the daily oral administration of the drug to patients suffering from jaundice and in whom there is usually anorexia, nausea, vomiting and other indications of an acute gastritis, would seem to be both theoretically and practically poor therapeutics. The drug, even in strengths of twenty-five per cent., is a gastric irritant and tends to retard the emptying time of the stomach and for these reasons would seem to be contraindicated orally, at least, as a daily procedure.

CONCLUSION.

1. From this series of cases I feel that the duration of catarrhal jaundice may be considerably shortened by the new and direct method of treatment.

2. The patient is usually relieved of gastrointestinal symptoms within forty-eight hours.

3. If the direct method of treatment is applied at the first appearance of jaundice one may naturally expect a shorter duration than by any other method.

4. The administration of calomel, one and one half to two grains by mouth, is of value as an auxiliary measure in the more obstinate cases.

REFERENCES.

1. HOPKINS, A. H.: The Treatment of Catarrhal Jaundice, *Medical Clinics of North America*, March, 1920, p. 1463.

1726 PINE STREET.

The Appendix and Diseases of the Adnexa.—

H. Thaler (*Wiener klinische Wochenschrift*, April 6, 1922) discusses the importance of differentiating between acute appendicitis and acute or exacerbating salpingitis. Careful examination should elicit, 1, the local symptoms; 2, the associated phenomena, and 3, the history, so as to limit the mistakes in diagnosis; in doubt only is an exploratory laparotomy indicated. The facts that exudate from the appendix may extend into the pelvis and involve the right adnexa and that the appendix may be subcecal (a pelvic organ) limit the value of the local findings in the differential diagnosis. The sign in favor of appendicitis are an early developing and externally palpable resistance in the right hypochondrium, associated with abdominal tension over it and pains radiating toward the stomach. The McBurney, Lanz and Kümmel points of tenderness are not reliable, Rovsing's and Blumberg's signs aid in the diagnosis. Primary adnexal diseases are recognized by an early resistance palpable bimanually deeply in the pelvis at the side of the uterus; a high location of such a resistance diminishes the value of this sign; frequently there is tenderness in the right vaginal vault; Fränkel's sign is valuable only in the early stage. A large adnexal tumor does not disprove the existence of appendicitis. The diagnosis is extremely difficult in the presence of simultaneous acute peritoneal symptoms, as with twisting of the pedicle of an adnexal tumor. If the local symptoms are not clear, the associated symptoms and the history may

be of assistance. In appendicitis, the signs of acute peritonitis are found more often. The difference between the axillary and rectal temperature is of value only in deciding between appendicitis and non-inflammatory adnexal diseases. Salpingitis is usually associated with gonorrhea or ascending septic infections. Irregular genital hemorrhages may occur. Chronic adnexal inflammation may be difficult or impossible to differentiate if the appendix lies in the pelvis. Severe right sided pains in spite of severe left sided palpable changes are significant. With an abscess in the cul de sac of Douglas, the differential diagnosis is not of much importance, as both require incision and drainage. Both conditions may be present simultaneously and completely, independently of each other (thirty per cent.); both may be caused by a common etiological or conditional factor, such as constitutional anomalies, tuberculosis, or carcinomatous tumors of the appendix (brastoma of the appendix). There may be a direct etiological relationship between diseases of the appendix and of the adnexa, and vice versa, without demonstrable direct contact of these organs. Backward displacements of the uterus may result in this way. Perisalpingitis and perioophoritis may result, with disturbances of ovulation and irregular hemorrhage. Appendicitis is no specially predisposing factor to tubal pregnancy. If both tubal ostia are closed, sterility results. Secondary involvement of the adnexa may cause dysmenorrheic disturbance. True appendicular parametritis and paratyphlitic abscesses in the pelvic connective tissue may develop secondarily to appendicitis, and diseased adnexa may cause adhesions of the appendix, with so-called cysts of the sorosa; metastatic disease of the appendix may be due to secondary contact with the diseased adnexa, usually by lymphatic propagation in the retroserous connective tissue.

Chronic Invagination Complicated by Suppurative Appendicitis.—Emmerich Frommer (*Wiener klinische Wochenschrift*, February 2, 1922) reports a case, hitherto unreported in the literature, in a woman fifty-eight years old, at which age both these conditions are rare, especially their coincidence. Such cases of invagination are not due to inflammation. In the author's case the development of the invagination could have been well imagined, if the tip of the appendix together with its mesentery had not been adherent: it was a case of a beginning total ileoceocolic invagination associated with an inflammatory process of the appendix. The question arises, which of these factors was the primary cause. An invagination may be caused by appendicitis as a result of the inflammatory, infiltrated surroundings, which cause excessive intestinal peristalsis and a resulting invagination on the one hand, and by the fixation of the perityphlitic adhesions on the other hand, which probably occurred in this case. However, it can also be easily imagined that the invagination may be caused by a secum mobile, dragging with it the appendix and strangulating the appendiceal artery, which is an end artery; the resulting venous congestion and infiltration are an excellent nutritive medium for the intestinal bacteria, which then produce the appendicitis and possibly gangrene and perforation.

Serous Meningitis in the Course of Gangrenous Appendicitis.—W. Steiger (*Wiener klinische Wochenschrift*, April 6, 1922) reports a case in which a boy eight years old was admitted to the hospital with the diagnosis of appendicitis and peritonitis. Operation revealed a diffuse peritonitis, originating from a perforated appendix. On the next day the patient had an epileptiform convulsion with complete unconsciousness and other signs of meningeal irritation, which lasted five days. Recovery followed two lumbar punctures, which showed a clear fluid with negative findings. The absence of pronounced focal symptoms, the slight rigidity of the neck and the low temperature pointed to a serous meningitis. The differentiation of this condition from tuberculous or purulent meningitis, pseudomeningitis and hydroencephaloid meningitis in gastrointestinal antointoxication of children is difficult; with an acute beginning, only the subsequent course and, above all, the lumbar puncture make the diagnosis. The prognosis must be guarded and the physician must not despair of treatment because of the apparent hopelessness of the condition. Repeated lumbar punctures constitute the therapy which should never be omitted.

The Double Arch of the Diaphragm in Diaphragmatic Relaxation.—Karl Hitzengerger (*Wiener klinische Wochenschrift*, March 30, 1922) reports a case to show that there is a third explanation for the double arch of the diaphragm as a sign of its relaxation. The explanation that the upper arch corresponds to the upper gastric wall is untenable for physical reasons. The second theory is that certain sections of the diaphragm protrude more than others, giving the staircase picture. The roentgenogram revealed the right half of the diaphragm at the level of the ninth rib with normal excursions during normal quiet respiration, but abnormally great excursions on deep breathing. The dome was at the level of the pulmonary arch of the heart shadow and did not move with respiration; with forced respiration the left diaphragm sank about one cm. together with its dome, but it simultaneously moved as a whole toward the midline, so that the highest point of the dome, at the highest point of respiration, lay more medially and the lateral portions were pushed against the thoracic wall. With Müller's test, the left half of the diaphragm was paradoxically elevated. Faradic stimulation of the right phrenic nerve caused a marked depression of the right diaphragm and stimulation of the left nerve caused a depression two mm. less than on deep respiration. The left half of the diaphragm showed no double arch. On the basis of the history, the roentgenogram and subsequent operation, the diagnosis of subdiaphragmatic relaxation was confirmed. The patient had a gastric ulcer with niche formation and roentgenography during an attack of pain showed most active motion of the left arch of the diaphragm, completely independent of respiration. The left half of the diaphragm sank into itself, followed immediately by the appearance of a new contour, which showed the same fate. At times there were even two, three or four such arches, with significant changes in the gastric gas bubble—alternate shrinking with loss of air and reappearance; the

rapidity of these changes varied. A small lateral portion of the diaphragm did not take part in this phenomenon—that part under the gas bubble of the splenic flexure. This phenomenon was not disturbed by quiet respiration. This finding was due to a peristaltic wave of the diaphragm producing the double contour, which was transmitted from the greater curvature of the stomach. This symptom cannot serve in the differential diagnosis between hernia and relaxation of the diaphragm.

Treatment of Cholelithiasis.—Pauchet (*Presse médicale*, November 9, 1921) asserts that cholelithiasis, occurring as a medical condition following angiocholecystitis, should be treated medically—even if previously treated by operation—for a few months or years by means of a proper diet, bile, and mineral oil, which combat constipation and promote the biliary flow that sweeps out the canaliculi in the liver. After operation the vichy cure is even more useful than before, expulsion of stones and their arrest in the bile duct being no longer threatened. Early operation is indicated in view of the fact that surgical intervention for stones in the bile duct is a serious matter while for stones in the gallbladder it is relatively free from risk.

Intussusception of Ileum.—M. H. Biggs (*Surgery, Gynecology and Obstetrics*, November, 1921) concludes that while intussusception is essentially a disease of childhood, it is found in adults with sufficient frequency to make it of surgical importance. Intussusception in childhood is usually spontaneous; in adults a demonstrable lesion can ordinarily be found. The most common cause for intussusception in the small intestine in adults is a benign tumor, which can often be diagnosed before obstruction occurs. Recurrent invagination is often present previous to obstruction. After surgical reduction of intussusception, tumor must be sought for and if present removed to prevent recurrence.

Dilatation of Common Bile Duct.—Reel and Burrell (*Annals of Surgery*, February, 1922) contend that during the past century, with its phenomenal development of abdominal surgery, there has been no apparent increase in the percentage of the occurrence of this condition. The preoperative diagnosis has never been recorded, due no doubt to its rare incidence. The striking clinical feature present in practically each case reported has been intermittent jaundice in the child or young adult usually associated with some form of palpable tumor mass in the upper right quadrant of the abdomen. It would seem that cystic dilatation of the bile passages should be considered in the differential diagnosis when the above mentioned clinical symptoms are encountered. The case serving as a basis for this discussion was a female, aged fifty-six. Her symptoms, however, were noticed at the age of twenty. Since that time her main discomfort had been gastric disturbance, intermittent jaundice, pain, and tumor formation. So far as was possible to determine, this was the oldest patient reported in the literature with this condition. The cyst containing approximately eight litres was in all probability the largest on record. The patient at the time the case was reported was enjoying good health and was able to attend to her household duties.

Cholecystotomy.—A. M. Willis (*Surgery, Gynecology and Obstetrics*, February, 1922) states that cholecystostomy with drainage is a procedure of great value in certain instances, but its use in unsuitable cases leads to frequent disappointment. Likewise, cholecystectomy is an operation of great value in many instances, but the trend toward removal of every gallbladder capable of removal will inevitably result in the sacrifice of many functionally valuable organs, the invalidism of a certain number of patients from injury to the bile ducts, and the premature death of others. The author's advocacy of the ideal operation in some of these cases is not based solely on theoretical considerations. He has already practised this procedure in a limited number of cases and the results obtained have been most gratifying and encourage him in his belief that this operation has a definite field of usefulness in the surgery of the gallbladder.

Ligation of Cystic Duct in Cholecystectomy.—Hartman, Smyth and Wood (*Annals of Surgery*, February, 1922) speaking of the results of high ligation of the cystic duct in cholecystectomy, assert that where a cystic duct stump is left, it usually dilates to form a pseudogallbladder; hence we may get a recurrence of the symptoms after a cholecystectomy. Where the cystic duct is ligated flush with the common duct, there is general dilatation of all ducts, indicating that there is pressure in the biliary system. The gallbladder is not essential to life, but it seems to have a definite function of storing bile and acting as a tension bulb to regulate pressure in the biliary system. Nature endeavors to restore the normal condition in the biliary system, after the removal of the gallbladder by the ducts, including the cystic duct stump undergoing a dilatation and enlarging. It is an indication that Nature rebels against man's attempt to improve on her, hence the gallbladder must have some definite function.

Cholelithiasis.—Norbert Ortner. (*Wiener klinische Wochenschrift*, March 30, 1922) discusses the clinical significance of infective biliary colic with or without gallstones. Gallstones predispose to infections. Infection is the basic cause of biliary colic and not the stone alone. There are aseptic gallstones, the cholesterol stones associated with stasis of the gallbladder from various intrinsic and extrinsic causes, which are latent; these may appear under the guise of an infectious biliary colic from enterogenic or hematogenic bacterial infection. Icterus is a rare phenomenon of gallstone disease, provided the infection and disease are strictly confined to the gallbladder and the icterus is not of septic origin. Chills may occur with or without subsequent fever (reflex, nervous). The characteristic localization of the biliary colic is behind the right costal arch, radiating to the right, backward and upward toward the shoulder. Radiation to the left must be differentiated, as it may be due to stomach cramps (pyloric), pancreatic disease, biliary calculus in the left lobe of the liver, or an associated left nephrolithiasis. A stone may be impacted in the neck or cystic duct of the gallbladder, or in the choledochus. The differential diagnosis between gallbladder and gallstone disease is based on the biliary colic, which may be localized in the gallbladder, in the large extrahepatic ducts,

in the liver itself, or it may be extrinsic. Carcinoma, tuberculosis, or gumma of the gallbladder rarely produces repeated attacks of biliary colic. Chronic adhesive pericholecystitis or perihepatitis may cause colic, even with fever and slight icterus. A rare condition is aneurysm of the artery of the gallbladder. Recurrent attacks of biliary colic may be produced by disease of the large extrahepatic bile passages with stenosis or closure of their lumina from intrinsic and extrinsic causes, such as tumors, ulcerations, echinococcus cyst of the liver, enlarged lymph nodes, acute or subacute liver atrophy, and icterus hemolyticus. The latter may produce gallstones. Lues and carcinoma of the liver, multilocular echinococcus cyst, liver abscess and peracute congestion of the liver must also be considered. Neuralgias of the liver (nontabetic) must be looked upon with suspicion, as they are usually due to cholelithiasis. Tuberculous peritonitis may originate in the liver capsule and may resemble biliary colic. The extrahepatic conditions to be differentiated are duodenal ulcer, colic from pyloric stenosis (on the left side), appendicitis, right acute paranephritis, subdiaphragmatic angina pectoris, neuritis of the right phrenic nerve, and malaria.

Preoperative Preparation for Obstructive Jaundice.—U. Walters (*Surgery, Gynecology and Obstetrics*, December, 1921) states that most patients with obstructive jaundice, who die after operation, succumb from intraabdominal hemorrhage. In most cases postoperative hemorrhage occurs when the coagulation time of the venous blood is longer than nine minutes. The coagulation time of the blood can be reduced greatly and the toxicity diminished in patients with obstructive jaundice by daily intravenous injections of five cubic centimetres of a ten per cent. calcium chloride solution for a three day period. Carbohydrates and glucose prevent disintegration of body proteins when the patient is in a state of toxemia. Large quantities of water aid in eliminating toxic bile pigments and increase the body fluids. It is selfevident that in operation for obstructive jaundice the various steps of the operation be carried out with the utmost gentleness, care being taken not to traumatize the tissues, especially of the liver, and for this reason cholecystectomy should not be performed at the primary operation if it can be avoided.

Pressure Points in the Cecal Region and Chronic Inflammation of the Cecum.—V. E. Mertens (*Wiener klinische Wochenschrift*, March 30, 1922) asserts that McBurney's point only indicates the region of the cecum and that Lanz's point indicates the real spot of the origin of the appendix. By actual experiments he was able to show that there was a distance of an average of three and eight tenths cm. (at the most five cm.) between these two points in the adult. Tenderness at McBurney's point, McBurney's and Lanz's points, and the Lanz point alone is found in the proportion of one, three and seven. Absence of tenderness at McBurney's point does not speak against chronic appendicitis. Kümmell's point lies higher, one to two cm. vertically below or somewhat to the right of the umbilicus, and may be present when the other two points are absent; it is frequently found in hysterical

patients. Lanz's point is valuable in those cases of chronic inflammation of the cecum which resemble gastric disorders. Pains may radiate in all directions from both McBurney's and Lanz's points, when these points themselves are insensitive. Pressure on Lanz's point may produce pain somewhere else in the abdomen without and connecting radiation. Operation in these cases often reveals slight changes—kinks or thin membranous deposits which inhibit the mobility of the appendix. A tender Lanz's point with radiation of pain is often seen in children who fail to thrive. Appendectomy works wonders in these cases. In children, the McBurney point is more frequently tender, but this may be an error, as both the appendix and cecal points lie higher in children. If the tenderness remains after appendectomy, it is due to adhesions. The radiating pains are explainable anatomically, corresponding as they do to the peritoneal nerve supply. There may be overstimulation or irritable cicatricial inhibition of the nerves.

Pneumococcal Peritonitis.—McCartney and Fraser (*British Journal of Surgery*, April, 1922) conclude that there is an essential division of pneumococcal peritonitis into two classes—primary and secondary. The primary class is peculiar to the female sex, because it is the result of infection of the peritoneal cavity from the genital tract. The primary type, according to the acuteness of the infection, may be subdivided into three different varieties—fulminating, acute, and chronic. Primary pneumococcal peritonitis begins as a pelvic peritonitis, and in a typical case the clinical features afford strong evidence of the pelvic distribution. The course of the disease shows two distinct stages—introductory and septicemic. The mortality has been greatly diminished by the use of blood transfusion at the commencement of the septicemic stage.

Benign Tumors of Stomach.—Ensternman and Santy (*Surgery, Gynecology and Obstetrics*, January, 1922) conclude that benign tumors of the stomach are rare and constitute only one and three tenths per cent. of all gastric tumors that have come to operation. The actual proportion of benign new growths to malignant new growths or ulcerations is one to two hundred. Myomata and fibromata constitute the largest group, gastric polyposis the most infrequent. About fifty per cent. of benign tumors are found in patients over forty. There is no characteristic syndrome and gastric chemism ranges from achylia to hyperacidity with hypersecretion. The summation of evidence favors the diagnosis of gastric cancer. The majority of the tumors are situated in the region of the pylorus, the greater curvature, anterior and posterior walls. The smaller tumors are practically symptomless unless situated at the orifices or unless multiple. Common complications are recurring hemorrhage, which occurred in thirty-seven per cent., and pyloric obstruction, which occurred in twenty-five per cent. Palpable mass, food retention, or six hour barium retention is less frequent than in gastric cancer. Often patients with benign gastric tumors are refused operation because the condition is regarded as malignant and inoperable. The true nature of the lesion is discovered only when the patients insist on operation. The surgical end results are excellent.

Function of Gallbladder.—Harrer, Hergis, and VanMeter (*Surgery, Gynecology and Obstetrics*, March, 1922) assert that the function of the gallbladder is that of a concentrator of bile, which concentration is effected chiefly by the lymphatics. That the gallbladder is emptied of its contents—if it is emptied at all through the cystic duct—by pressure of adjacent, distended and congested organs during digestion, and by the milking action of the duodenal peristaltic waves, and that the rhythmic contractions of the gallbladder are of no importance in this respect. That by means of the lymphatics infections are carried from the gallbladder to the glands at the head of the pancreas, producing a lymphangitis and lymphadenitis and a lymph stasis which later becomes organized and results in chronic pancreatitis.

Volvulus of the Cecum from False Torsion of the Umbilical Cord.—H. Lehman (*Wiener klinische Wochenschrift*, February 23, 1922) describes a case in which the site of the strangulation was at the perforation of the colon through the mesenteric root. The ileus followed a trauma. Distinct symptoms of intestinal obstruction developed. The operation revealed a cecal clockwork torsion of 360 degrees about a hand's breadth above the Bauhinian valve, causing a complete closure of the gut. A common ileocolic mesentery allowed sufficient mobility for the development of the torsion. The whole colon beyond the site of the torsion was resected and a side to side ileocolostomy was done at the site of the remaining ascending colon and recovery followed. The diagnosis of such cases has always been considered to be impossible, especially in emergencies, but in cases with a long history of intestinal obstructive disturbances, a roentgenogram is of great assistance in making the diagnosis, as it shows an abnormal position of the duodenum and the colon dorsally to the stomach; also great distention of the left portion of the colon, suggesting a retroposition.

Some Human Digestion Experiments with Raw White of Egg.—Mary Swartz Rose and Grace MacLeod (*Journal of Biological Chemistry*, January, 1922) conducted experiments on ten healthy young women, who took daily from ten to twelve whites of eggs as a part of a simple mixed diet. The eggs were first taken cooked in a three day period, and then raw for the same length of time. In one group of experiments the raw egg whites were taken thoroughly beaten; in another they were used in their natural state, and in a third group they were half beaten and half unbeaten. The results of their experiments are as follows: Raw egg whites, in as large amounts as ten to twelve whites daily, are well utilized in the human subject, the average coefficient of digestibility calculated for the raw egg white alone being eighty per cent., compared with eighty-six per cent. for cooked whites in the same diet. The absorption varies with the method of preparation, being less for raw egg whites taken in their natural state than when beaten light. A mixture of whites partly beaten and partly unbeaten gave an intermediate value. The quantities consumed are regarded as maximal in dietary practice, and it seems unnecessary to emphasize the difference between raw and cooked eggs if the raw eggs are beaten.

Ascariasis of the Bile Passages.—Arthur Neudörfer (*Wiener klinische Wochenschrift*, February 23, 1922) reports four such cases, which are seen much more frequently since the world war. This condition resembles acute cholangitis most, but is differentiated from it by the severe and continuous pain simultaneous with the attack and the pulse frequency. The patient appears critically ill, with legs drawn up and a purely costal respiration; the temperature is 38° C. to 39° C. and the pulse frequency is 120 or over; the icterus is pronounced. In contrast to acute pancreatitis, acute cholangitis and a perforated gastric ulcer, the upper abdominal wall is soft and not tender; the gallbladder is at first not enlarged and not tender, but on deep pressure to the right of the midline under the left lobe of the liver, pains are felt. It is still a moot question whether the cause of the severe intoxication is the toxin of the ascariides or the acute cholangitis from the penetration of the parasites into the large bile passages.

Megacolon.—Fowler, Davidson, and Mellon (*Surgery, Gynecology and Obstetrics*, May, 1922) in a consideration of congenital megacolon in an adult, concludes that the so-called idiopathic megacolon is relatively infrequent in childhood and rare in the adult. The only congenital feature of megacolon is the redundant sigmoid. The unobstructed redundant sigmoid may be nearly or quite symptomless. The degree of obstruction, from whatever cause, determines the subsequent course. Relatively slight obstruction produces a definite syndrome without dilatation or hypertrophy. Acute obstruction, either primary or superimposed upon hypertrophy, induces sudden dilatation and the desperate picture common to such obstructions. Chronic obstruction causes gradual dilatation and compensatory hypertrophy, the type described by Hirschsprung. Kinking, or valvelike action at the rectosigmoid junction, is the usual cause of obstruction. When the rectum, also, is involved, anal spasm is a likely factor. The surgical treatment of megacolon aims at removal of the crippled bowel and restoration of the intestinal continuity.

Gastric Ulcer.—E. Klein (*Annals of Surgery*, December, 1921) states that gastroenterostomy performed for the cure of gastric ulcer may be followed by, a, hemorrhage, which in half of the cases probably comes from the unhealed ulcer; b, perforation of an unhealed ulcer; c, carcinomatous degeneration of the ulcer; d, persistent or recurrent gastric symptoms, which in some of the cases are due to the unhealed ulcer. Gastric ulcers may develop in the stomach in the presence of a gastroenterostomy. This does not refer to gastroduodenal ulcers. A case is reported where the persistence of gastric symptoms was due to an unhealed prepyloric ulcer following a well performed gastroenterostomy. The symptoms yielded to partial gastrectomy. If at all possible the surgical treatment of peptic ulcer should include the removal or destruction of the ulcer. It is unfair to compare mortality statistics of partial gastrectomy and gastroenterostomy, since the former operation can cure severe cases in which the latter is entirely without effect and might just as well not have been done.

Proceedings of Societies

MEDICAL SOCIETY OF THE STATE OF NEW YORK.

*One Hundred and Sixteenth Annual Meeting Held
in Albany, April 18, 19 and 20, 1922.*

SECTION IN SURGERY.

Dr. GEORGE W. COTTIS, Jamestown, N. Y., Presiding.

Some Phases of the Surgery of the Spleen.—Dr. ROYALE H. FOWLER, of Brooklyn, said that indications for splenic surgery comprised three groups: 1, injuries, abscesses, cysts, new growths; 2, diseases of the blood forming system, comprising Banti's disease, Gaucher's disease and hemolytic jaundice; surgery in this group was empirical, as the splenic disease was one link of a chain of a diseased system; 3, pernicious anemia, primary cirrhosis of liver with splenomegaly, leucemia and polycythemia vera, the results in the latter diseases being variable. Group I: a. Traumatic rupture with or without other injuries; there were forty-one splenectomies, with fifteen per cent. mortality. b. Spontaneous rupture, usually in hypertrophy. There were five splenectomies without mortality. c. War wounds. These were usually multiple; operation averaged eight hours after injury. Forty splenectomies gave a fifty per cent. mortality. d. Abscess, usually from typhoid fever. Excluding infarction, splenectomy gave a mortality of from twenty-one to twenty-three per cent. e. Cysts: These include, dermoid cysts; nonparasitic cysts, in which malaria, syphilis, and pregnancy were the usual etiological factors; pseudocysts; echinococcus cysts; sarcoma and cavernous angioma have been reported. Group II: Banti's disease, operative mortality in the first stage was twelve per cent, and in the ascitic stage fifty per cent. Gaucher's disease; nineteen cases had been reported as splenectomized, with five deaths. Hemolytic jaundice: The literature quoted ninety-six cases splenectomized, with a mortality of three and one tenth per cent. Group III: Pernicious anemia: The Mayo Clinic reported five cases of four year cure, after splenectomy. Other reports were less hopeful. Splenectomy figures in leucemia showed an alarming mortality. In polycythemia vera the mortality was very high, but some good results had been reported. In cirrhosis of the liver, early operation should give good results. Late operations were fatal.

Dr. J. M. HITZROT, of New York, said that in some cases operation on the spleen disclosed a small accessory spleen, attached to the larger organ. With excision of the primary spleen the secondary one tended to develop and assume normal proportions.

Dr. ROBERT T. MORRIS, of New York, said that the point made by Dr. Hitzrot relating to the growth of a full sized spleen from a small adjuvant spleen, after removal of the larger organ, seemed to him to be very significant. It included the idea that Nature really felt the need for a spleen and a large one. When the ovaries had been removed, some latent rests of ovarian tissue in the broad ligament sometimes developed into actively functioning organs. On the other hand, when the appendix or gallbladder

were removed, Nature apparently made no effort to replace them, apparently leaving them in the category of vestigial structures without present day usefulness.

Cholecystitis; Its Relation to Infection of the Liver and Pancreas.—Dr. W. HOWARD BARBER, of New York, said that good clinical histories undoubtedly remained the most valuable means of interpreting gallbladder cases; these supplemented with reliable experimental work added to our knowledge of the liver and pancreas. The gallbladder, liver, pancreas and other healthy organs had been found to harbor bacteria, and the presence of bacteria in the blood stream was not necessarily pathological. Microorganisms were found both in health and in traumatic and anesthetic shock. Fecal tissues were almost free of them. Latent bacteria in the gallbladder walls might become a source of reinfection of other tissues, as they might be carried by the blood and lymphatics, or by contiguity of tissues, to the liver. Portal borne infection was the most common and accounted for the cholecystitis that accompanied appendicitis, duodenal ulcer, splenic disease, and other lesions in the portal field. The organisms, after being strained out by the spleen, were sent to the liver for destruction; this organ encapsulated organisms, such as typhoid and protozoa, surrounding them with connective tissue, as seen in portal cirrhosis. The gallbladder was probably infected by lymphatic extension. With cholecystitis there was coexistent hepatitis, and the infection then passed to the pancreas by way of the regional lymphatics. Pancreatic lesions existed in about twenty-five per cent. of cases of hepatic cirrhosis. Deaver called this disease pancreatic lymphangitis. Infection carried by bile might cause acute pancreatitis. The best treatment for cholecystitis was cholecystectomy, with drainage through the cystic duct preferred.

Pancreatitis.—Dr. HARRY R. TRICK, of Buffalo, stated that his attention had been called to this condition by two cases occurring near together and not correctly diagnosed. The infrequency of these cases often caused them to be missed, although occasionally a real triumph in diagnosis was secured by their early recognition. At the Buffalo General Hospital, thirteen cases had been seen in the past two years, four of which were correctly diagnosed. The condition was always a serious one. In 1889, Dr. R. H. Fitz brought out a publication based on his thirteen years' work on this disease. He classified the pathology into three types: suppurative, hemorrhagic and gangrenous. This division, though not entirely comprehensive, served to differentiate upper abdominal lesions. The disease was probably caused by an extension of a process from some adjacent organ; the cause might be either chemical, pyogenic, or mechanical (as in trauma). The activation of the gland substance caused destruction by its own secretion. The secretion could be activated by bacteria, so that blood stream infection was possible. Attacks had been known to follow acute infective

disease. Autolysis of the gland produced various forms of discoloration, and the typical "beef broth" exudate was given off in large quantities. Gland destruction liberated the fat splitting enzyme, causing fat necrosis, both near and distant. A serious form of the disease was pancreatic apoplexy, in which type the hemorrhage occurred first. The clinical symptoms of the disease were acute, unbearable pain in the epigastrium, vomiting and collapse. A curious yellowish cyanosis appeared on the upper part of the body. The swelling over the gland was deep seated and resistant. The pulse was slow and fairly good until collapse occurred. In profound collapse surgery was useless, as pancreatic apoplexy was indicated. In the less serious forms, simple incision and drainage of gland debris were all that should be attempted until the patient was over the crisis and definite improvement seen. Proper surgical measures could then be instituted.

Some Phases of Gallbladder Surgery.—Dr.

WILLIAM D. JOHNSON, of Batavia, N. Y., suggested drainage of the gallbladder in the early stages of toxemia of pregnancy. He found this relieved the vomiting. In seven cases in which this operation was applied, he found bile as thick as "jack wax." In all cases the vomiting was stopped in from twelve to twenty-four hours, though one patient died two weeks later of acidosis. No postmortem was obtained. The author thought that toxemia might be due to an incompatibility of fetus and mother, and suggested the typing of blood of parents, and the checking up of cases where incompatibility existed. If the mother belonged to group II and the father to group III, the case could be followed to see if it was from such a union that toxemia occurred. The picture of the liver in cases of pernicious vomiting was like that of acute yellow atrophy, and the centre of the liver lobule was affected by the poison. Reports had shown agglutination of the red blood corpuscles (thrombi), which might be caused by the incompatibility of the blood. The author emphasized features of importance in the surgery of deep jaundice. If it was desired to do cholecystogastrostomy, or cholecystoduodenostomy, anastomoses by suture should be avoided, as oozing from stitch holes might result. The Murphy button could be used to form a button anastomosis; both the gallbladder and the stomach were perforated with the cautery. The pressure of the Murphy button would check hemorrhage. Use of the cautery along the edges of the incision would check oozing. Little help was obtained from the various agents to increase the clotting time of the blood. Transfusion might be of help. The Mayo Clinic used an injection, for three days postoperative, of five c. c. of ten per cent. solution of calcium chloride intravenously. To drain the gallbladder, the speaker used the Murphy button, with the drainage tube attached to one part, the other part in the gallbladder, and clamping the two parts together. Clamping the tube controlled the outflow.

Operation for Subcostalgia.—Dr. MARSHALL CLINTON, of Buffalo, said that the papers presented by Dr. Barber, Dr. Johnson and Dr. Trick were most instructive and helpful. There was one point in the diagnosis of the diseases under consideration

to which he wished to call attention. They were all familiar with the patient who complained of pain in the epigastric, appendix, or kidney region; the patient, for example, whose gastric reflexes did not measure up to the type expected with lesions in these structures; whose pain came on when he was up and doing and was absent when lying quiet in bed. They were also familiar with the feeling of disappointment experienced when one of these patients returned complaining of a recurrence of pain soon after apparent recovery from an operation for appendicitis, gallbladder or kidney disease. An important clinical entity that had been overlooked very generally had been found and would be reported for the first time.

Dr. JAMES A. SULLIVAN, of Buffalo, in an unpublished paper had described this interesting condition under the name of subcostalgia. The symptoms of this condition were pain in the region of the appendix, epigastrium or kidney. The diagnosis was made by pressure over the subcostal nerve at the tip of the twelfth rib, by pain produced by tipping the body sidewise and forward, and by observing under the screen the tip of the twelfth rib riding on to the ilium.

The pathological report of Dr. Roman, pathologist to the Buffalo General Hospital, was as follows: "The epineural tissue appears increased, especially in the immediate vicinity of the nerve bundles and comparatively poor in fat cells. In some places the perineurium seems slightly thickened and mostly shrunken, its internal part being continuous in many nerve bundles, with a rather thick layer of delicate endoneural connective tissue which partly or completely encircles the nerve bundles. The latter shows thickening of the connective tissue (sheath of Heule) around many individual fibres, and in places a decided increase of the endoneural nuclei can be seen. The number of fibres, on cross section, seems diminished, especially in such places where considerable areas are obliterated by patches of hyaline connective tissue. In the epineurium the small bloodvessels appear thickened and rather numerous, showing very little or no perivascular cellular infiltrate."

To cure these patients resect an inch and a half of the twelfth rib with two inches of the subcostal nerve. The cure of a patient with this condition is most gratifying and one removes by its successful application another group from the list of so-called neurasthenics.

The Causation of Symptoms in Cases Simulating Appendicitis.—Dr. HOWARD L. PRINCE, of Rochester, N. Y., said that there was considerable pathology of chronic appendicitis outside of the appendix. The oratorical period of acute appendicitis, which was, roughly, in full flower from 1900-10, had hardly been forgotten. The public was alarmed, and the prominence given to the disease obscured other conditions in the abdomen. Then prominent leaders came out and announced the dire evils of chronic appendicitis, with its train of attendant manifestations, such as disease of the intestines, kidneys, gallbladder, pelvis, and other organs, while at the same time it was stated that the removal of the offending organ was a perfectly

harmless procedure. Then the operative dam broke, and the flood came! Continued experience, however, with the results of operations for chronic appendicitis, had not been accompanied by a solution of its problems. There was, on the one hand, a public cognizant of the dangers of appendicitis, and the profession alert to detect the possibility of a chronic appendicitis underlying any abdominal symptom complex. The result was easy to discern. Any person who complained of abdominal symptoms was, on short order, minus an appendix.

As to afterresults: the pathologist reported "normal appendix" in from ten to fifty per cent. of cases, and the followup work revealed "unrelieved appendix" in from fourteen to fifty per cent. of results. Some of these patients were about the same, some were worse, some were labelled "neurasthenics." Inquiry showed that a large majority of people who complained of appendicitis, underwent other treatment, such as perinorrhaphy, fixation of kidney, removal of gallbladder, and various other abdominal repairs.

When we came to inquire into end results, we found that it was to the patients who had not reported that surgeons ascribed their best work. The profession must look facts squarely in the face. To what could be ascribed the cause of these well known symptoms—headache, backache, nausea, dragging sensation on the right side of the abdomen, pain, constipation, mental disturbance, anorexia—if not to chronic appendicitis? What were the real appendiceal symptoms? One point could be emphasized: The appendix to cause symptoms must suffer obstruction to its lumen, or must have inflammation. The result of its obstruction as a viscus was a colicky pain, about or above the umbilicus, generally with nausea; with inflammation there was tenderness over the appendix. These were two constant findings. The possibility of appendicitis was suggested only by pain and tenderness in the right lower quadrant; it might or might not be so. The colicky mid-line pain was the first consideration. A good barium examination was a great aid to diagnosis, as a confirmatory measure. When supposed appendicitis caused urinary symptoms, look for the trouble in the urinary tract. Indigestion, flatulence, etc., might be due to bad habits or poor posture, to organic or to mental pathology. A careful neuropsychiatric examination would help to cover this ground. Surgeons had formed the habit of considering the appendix the safest bet and playing it against the field, but this attitude ignored the twenty to fifty per cent. of failures and the thousands of observations in what the profession was pleased to call the "science of surgery." The situation could only be changed by facing facts and taking just blame for mistakes that had been and were being made.

Dr. W. D. JOHNSON, of Batavia, said that Dr. Prince's paper was based on facts. Often the rule was to say "normal appendix" and then wait to see what happened. The abdomen should be opened in the midline so as not to miss any condition, and the appendix looked at last. A chart should be put on the wall to remind surgeons of things they were constantly forgetting. That was one benefit of medical meetings, to remind one of things frequently forgotten.

Dr. JOHNSON, of Albany, said he had a long history of chronic appendicitis. The appendix was removed, but later the symptoms returned and he was found to be suffering from duodenal ulcer. How could one have arrived at that diagnosis?

Dr. JAMISON, of Poughkeepsie, said many cases of gastric crises of tabes had been diagnosed as chronic appendicitis and operation performed. He never did an appendectomy *per se* but explored the whole abdomen. Often duodenal ulcers cleared up after removal of the appendix. If the case were approached with a judicial mind and every possibility considered there would be fewer bad results after appendicitis operations.

Dr. Prince, in closing said that good surgery must be done where it belonged and the surgeon must be willing to sell the same stuff to his patients that he would take himself. Surgeons ought to be able to arrive at living pathology and not have to go to the dead house for it. The achievements of surgery and the enthusiasm of surgeons were undoubted facts, but surgeons must inquire into results with the same enthusiasm with which they operated, and then they would begin to lower the terrible percentage of failures.

Intestinal Obstruction Following Unrecognized Cases of Appendicitis.—Dr. ARTHUR M. DICKENSON, of Albany, N. Y., said that surgery of the viscera was better known than that of obstruction. Mortality in intestinal obstruction had not greatly decreased, because delay and later diagnosis brought patients to the surgeon too late. In the first twelve hours the mortality was only five per cent., but this rose to twelve per cent. after twelve hours and thirty-one per cent. after twenty-four hours. When paralytic ileus was excluded, the other factors included volvulus, intussusception, bands, kinks, gallstones, malignancy, and adhesions. Symptomatology included vomiting, which was first gastric, then duodenal, then fecal; the pain was cramp-like and intensified by catharsis. An important diagnostic sign was the patient's inability to pass flatus. The higher the obstruction, the less the distention, but the more dangerous the case. Dr. Dickenson felt that delay in operation often resulted in later operations being performed on moribund patients. He would rather see a few exploratory laparotomies uselessly done, if more lives could be saved in locating this condition early. He recalled the case of a young man, who for four years had suffered from attacks of appendicitis symptoms, with left sided pain, which had been diagnosed bladder trouble. The site of the pain here was probably due to pull of the omentum or referred pain from subdiaphragmatic pressure from the distended jejunum. The patient was not brought to the hospital till in a state of shock, and he died in two hours. Postmortem examination disclosed a ruptured appendix bound down with adhesions, distention of the small intestine, and a walled off abscess behind the rectum and bladder. This case emphasized the necessity of early diagnosis.

Dr. EDGAR A. VANDERVEER, of Albany, said the question of diagnosis was of more interest than that of operation. The finding of an abdomen full of adhesions was due to unrecognized appendicitis, though not so extreme as in Dr. Dickenson's case.

Dr. Vanderveer believed that surgeons got the cases earlier nowadays, especially gallbladder and appendix lesions. He summed up by saying, "When in doubt, go for the appendix."

Dr. WILLIAM L. WALLACE, of Syracuse, said that the x ray would show the enormous coils of distended intestine, with absence of gas distention at the site of the abscess. Rectal examination helped in all doubtful cases. In obstruction with collections of pus, the abscess could be opened through the rectum.

Dr. JAMES E. SADLER, of Poughkeepsie, said that intestinal obstruction was one of the saddest chapters in operative history. The mortality continued high. Had any man in the room a mortality of less than twenty-five per cent.? Yet it should be easy to make the diagnosis. Dr. Sadler took exception to Dr. Wallace's statement that the x ray was necessary. Careful history and careful physical examination ought to make the diagnosis. He thought Dr. Dickenson should have read his paper before the medical section instead of the surgical. The medical men insisted on giving catharsis and watching the patient and the time passed when it was possible to save the patient's life.

Dr. T. L. DEAVOR, of Syracuse, said that the more we refined methods of diagnosis, the further we got away from the real condition. Instead of using laboratory facilities and the x ray, one should operate at once for an acute abdominal, surgical condition and save the patient. Dr. Wallace said he would like to correct a misapprehension. He did not give barium enemata. One could see the coils of distended intestine filled with gas, by means of the bedside unit, in about a minute. Dr. Dickenson, in closing, said that the question was simply one for or against operation. A certain train of symptoms was recognized which necessitated exploratory operation.

Should Gastroenterostomy Be Performed in Presence of Ruptured Duodenal or Gastric Ulcer?—Dr. DONALD GUTHRIE, of Sayre, Pa., said that on account of the conflicting reports as to mortality and morbidity of this operation, he sent out a questionnaire to 150 leading surgeons comprising the following questions: 1. Do you do gastroenterostomy? 2. What are your postoperative results; do you have to reoperate later? 3. If you do gastroenterostomy, what is the mortality? 4. Do you employ drainage; how long do you leave it in?

To the first question there were four classes of replies: twenty-two men do gastroenterostomy as a routine; sixty-four men do not perform it; thirty-four men gave a qualified affirmative; twenty-nine men gave a qualified negative. The last two groups were conservative in tone. To the second question fifty-seven reported that it was not necessary to reoperate; fifty said it was necessary to reoperate. To the third question various mortality rates were given—from nothing to sixty per cent., some believing that gastroenterostomy increased the mortality. To the fourth question 137 answers were received, of which 101 used drainage; twenty-three men mentioned suprapubic drainage. Drainage periods were stated to be from twelve hours to twelve days. Deaver stated that he did gastroenterostomy but added it should only be done by skilled

surgeons. The difficulty with this condition was that few men would admit they were not skilled. The Mayos considered gastroenterostomy simply an emergency operation. Their postmortem studies showed ten cases in which gastroenterostomy would have failed in saving the patient. Most surgeons stated that it was unwise to do gastroenterostomy at the same time as the closure, but that it might be done later, thus giving a chance for two safe operations instead of one risky one.

Dr. W. D. JOHNSON, of Batavia, said in regard to drainage, that early cases had chemical peritonitis and later cases bacteriological peritonitis, so that after twelve hours drainage was needed. Morrison's pouch was a safe place to drain. A soft tube could be pushed down over the brim of the pelvis and the patient turned over on his right side to obtain postural drainage.

Dr. JAMISON, of Poughkeepsie, said the old chronic ulcer with scar tissue would call for gastroenterostomy, if perforated. The embolic type, in which the patient suddenly collapsed, needed only simple closure. The procedures would vary for gastric and for duodenal perforation. There was no routine measure, but judgment must be used to save the patient. The ascending colon acted as a temporary dam to shut off irritating fluid. In old caloused ulcers, after closing the perforation, one could get a clean outfit and do gastroenterostomy in a clean area. The patient showed signs of improvement as soon as tension in the stomach got relief.

Dr. EUGENE POOL, of New York, found no difference in the patients operated on within six hours, in regard to gastroenterostomy or no gastroenterostomy. In early cases good results were obtained, and in late cases there was a high mortality whatever was done. The series was followed for seven years and it was found that in ten out of fifty-seven there was barium retention and second operation was needed. In three cases this was refused; in seven the patients were reoperated upon and did well. The other cases needed no second operation. Thus it would seem that two thirds of the patients would never need it, and to subject them to unnecessary gastroenterostomy was useless, since those who would need it could be operated on at some later date for retention. As to drainage, early cases did not need drainage of the peritoneal cavity. All cases should be drained to the peritoneum because of the irritant action of the extravasated gastric fluid, which caused superficial wounds to break down.

Dr. DEAVOR said he was opposed to gastroenterostomy and often did without closure, simply using an omental graft. He preferred suprapubic drainage to no drainage, and had obtained useful results from a suction apparatus.

Dr. Guthrie, in closing, said that his paper dealt with duodenal, and not with gastric perforations. One often observed Nature's work in closing with omentum. It was hard to tear away. In regard to the type of operation, he personally would refuse to let anyone do a Finney on him except Finney himself. If he were yelling with pain he would want the ulcer closed as quickly as possible and get it over. He could not bring himself to do gastroenterostomy as a routine practice at the time of closure.

(To be concluded.)

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GREGORY STRAGNELL, M. D., Editor

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NEW YORK, WEDNESDAY, JUNE 7, 1922.

Miscellany.

Chronic Bacillary Dysentery and Colitis Gravis.

—D. Kling (*Wiener klinische Wochenschrift*, March 16 and 23, 1922) draws the conclusion that all those factors which cause any form of colitis may also cause a colitis gravis on the exhaustion of the healing tendency following constitutional or accessory factors. Among the curative factors, the most important is diet, which should consist of nonirritating, nonresidual, but yet nutritious food of wide selection; it should have the proper consistency and it should be finely divided and well chewed. Specific therapy has proved unsatisfactory. Symptomatically, opium, belladonna suppositories and morphine were used for cramps and tenesmus; papaverin and atropine are useless in moderate doses. Light baths of half hour duration relieve pain and intestinal unrest. The hemorrhages remained unaffected by the usual antihemorrhagic remedies. The administration of tannin and bismuth preparations are of little use and less valuable than local applications of astringent and disinfecting remedies in the form of inoperistaltic irrigations, enemas through an operative intestinal fistula, or as powder treatment (Zweig). Every irritation of the intestine must be avoided and a sufficient, mechanical cleansing and chemical effect must be obtained. Dermatol enemas were used and the irrigation through the fistula were given with physiological saline solution; if no reaction resulted, thinner solutions of ichthyol, tannin and silver nitrate were used, and later their strength was increased if no reaction set in. The results were unsatisfactory; only six out of eighteen patients were discharged markedly improved clinically and rectoscopically. As the internal therapy was ineffectual, surgery was tried; the irrigation fistula or an artificial anus. The former provides more ex-

tensive cleansing and the latter also puts the intestine at rest. Enteroanastomosis has proved valueless. The application of an irrigating fistula is a slight operation, its closure is rapid, the treatment can be continued in the ambulatory patient, who is disturbed but little by it. The artificial anus has a high postoperative mortality, its closure is complicated, and sometimes impossible, the fecal soiling is troublesome, the patient is confined to the hospital and the result is not as satisfactory as that from an irrigating fistula. The latter is used almost exclusively of late. Operative interference does not radically remove the seat of the trouble in colitis gravis, but only serves as an adjunct to internal therapy, provided it is instituted as early as possible. Total colectomy should be done only if the patient has sufficient resistance and in the severest cases. Only the application of an irrigating fistula should be attempted and it should be kept open as long as possible to avoid recurrence.

Mixed Bacteriophages.—Oskar Bail and Tai Watanabe (*Wiener klinische Wochenschrift*, February 23, 1922) on close examination of the Shiga-bacteriophage "Lauda," which consists of a partial bacteriophage, found both large and small and also very small holes in the agar plate, showing that the natural bacteriophage as derived from human stools, as far as the effect is concerned, is not due to a uniform microorganism; not only is there a third partial bacteriophage in Lauda, as shown by medium large holes in the Shiga plate, but other stool bacteriophages may consist of a mixture of individual bacteriophages, which also differ among themselves. This is important in deciding the question of specificity of the bacteriophage action on various bacteria, as of dysentery and typhoid fever. The methods of isolating partial bacteriophages all depend upon the fact that in the simultaneous inoculation of agar plates with bacteriophages and bacteria, holes arise which on dilution appear distinct and can be inoculated into broth on contact with the platinum needle; the associated bacteria then supply the nourishment for the first increase of the bacteriophages. On repeated inoculation with broth inoculated with Shiga bacilli, these partial bacteriophages can be cultivated indefinitely, but their pure culture is difficult to obtain, as it is very difficult to determine whether the large holes do not also contain smaller holes. It was conclusively shown that there is a combined effect of the partial bacteriophages, different from that of the individual bacteriophages. The independence of the small from the other bacteriophages was also demonstrated serologically, where the large and medium bacteriophages show a close relationship; however, the relationship between large and small bacteriophages may change. The specificity of effect and that of reproduction must be differentiated: there are bacteriophages which act powerfully on various bacteria, as the Shiga and colon bacilli, which can be cultivated indefinitely only with the former, and there are also those that can be fed with other bacteria and act upon both; frequently this is accompanied by a change in the size of the holes. The same bacteriophage may show large holes predominantly on the Shiga plate and small holes on the Flexner plate.

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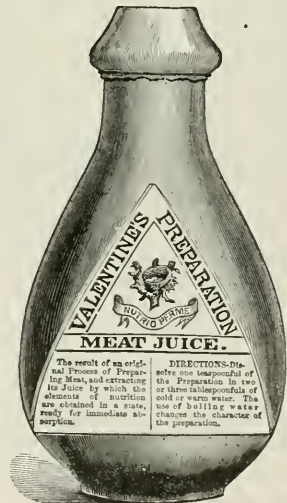
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Sugar Content of the Cerebrospinal Fluid and Its Diagnostic Value, Especially in Encephalitis Lethargica.—R. Coope (*Quarterly Journal of Medicine*, October, 1921) investigated the sugar content of the cerebrospinal fluid from cases of encephalitis, and other diseases. His own observations confirm the conclusion drawn from a survey of the literature of the subject, that is, the French tendency to regard a high sugar content as in favor of encephalitis lethargica does not seem justified, as figures quite as high occur in many other nervous diseases. A low sugar content, especially one below forty mg. to the hundred c. c., is strongly in favor of an infective meningitis. In cases of tuberculous meningitis an investigation of the sugar content of the cerebrospinal fluid is especially valuable.

Treatment of Eye Diseases with Tuberculin.—J. Meller (*Wiener klinische Wochenschrift*, March 2, 1922) maintains that the general practitioner should know that cases of iridocyclitis or chlorioiditis should be carefully examined as early as possible and an etiological diagnosis should be established, so that he may either continue the indicated treatment or instruct the patient to seek competent consultation; he should also know that many of these cases respond to tuberculin treatment. Uveitis, formerly considered as idiopathic in women at the climacterium, frequently responds very well to carefully conducted tuberculin therapy. It is important not only to heal the existing inflammatory exacerbation, but also to prevent such recurrences, thereby improving the vision. The general practitioner should also know that there is no advantage in rapidly increased doses, as these may cause serious damage.

Healing in Transplanted Bone.—S. L. Hass (*Journal of Bone and Joint Surgery*, April, 1922), speaking of spontaneous healing inherent in transplanted bone, states that bone when transplanted into a muscular bed, and thereby removed from any possible influence of other osseous tissue, shows definite signs of cellular activity. It has been previously shown that even though there is an initial degeneration of the greater part of a transplanted bone, a sufficient amount of osteoblastic tissue survives in the region of the periosteum, endosteum, and about the Haversian canals, to regenerate the new bone. Furthermore, if the transplanted bone is not subjected to functional stimulation it will gradually undergo a second and permanent degeneration. In the case of transplanted bones in which fractures have been produced, there is made an additional demand upon the regenerative powers of osteoblastic tissue. This demand is complied with in such a way as normal bone responds to the call for the repair of a fracture, namely, the formation of cartilaginous callus which later becomes ossified. This response takes place, even though the bone is removed from the normal functional stimulation, but on account of the lack of functional demand it, too, undergoes degeneration. In view of the fact that the osteoblastic components of a transplanted bone possess sufficient energy to produce the union of a fracture, even when buried in muscle, there must be ascribed a considerable importance to the regenerative powers of the cells of such a live piece of bone. He gives the following conclusions:

1. There is sufficient energy stored in the osteoblastic cells of a live bone transplant, placed in a muscle and removed from all osseous contact, to form a union between two fragments of a fracture produced in such a transplant.

2. Because of this very active, independent, regenerative and reparative property innate in the live bone transplant it is advisable to utilize living bone, whenever possible, for any purpose where a transplant is indicated.

Lower Back Pain.—J. R. Kuth (*Journal of Bone and Joint Surgery*, April, 1922), from a study of 208 cases of lower back pain, states that any injury or disease affecting the lower back structures (muscular, ligamentous, bursal, osseous or joint) may give rise to a similar symptom complex in cases of chronic low back pains. Unfavorable static conditions in the lower back or extremities resulting from abnormalities in the lower extremities, postural or occupational strains, or from fatigue or weakness, frequently exist in these cases and operate as a cause in the production of symptoms either alone or in conjunction with other causes. In all cases of low back pain, the possibility of a progressive disease of the spine or of the spinal cord should be kept in mind. The best results from treatment were obtained in cases in which static abnormalities were corrected, in which lower back structures were protected or put at rest, and in which such structures, if shortened, were stretched. Graduated systemic exercises are an important adjunct in the treatment of many of these cases.

Low Back Pain.—J. T. O'Ferrall (*Journal of Bone and Joint Surgery*, April, 1922) in a clinical study of the cause of low back pain concludes as follows:

1. That the major portion of the cases of low back pain seen in the Orthopedic Clinic of the Touro Infirmary are believed to be sprains of the lumbosacral ligaments, with many superimposed intercurrent infections, including lues.

2. That the location of pain is definitely assigned by the sufferers to the lumbodorsal joint or the lumbosacral angles, and not in the neighborhood of the sacroiliac joint.

3. That no examiner does his full duty to his patient nor can he arrive at an accurate diagnosis unless a careful and complete examination is done (possibly excluding the heart and lungs), especially in reference to infectious foci; and further, that he insist upon these foci being cleared up.

4. That too much dependence is put upon the x ray as an aid to diagnosis. It is most useful in determining fractures and real dislocations in and around the low spine, but that bony anomalies and so-called sacroiliac separation shown should not be interpreted as the cause for the low back pain, especially in cases of sudden onset.

5. That a venereal history and investigation are of great importance in both sexes.

6. That adhesive plaster strapping when applied promptly and firmly to the entire spine gives early relief, but should be supplemented with some form of permanent fixation for a short period after the temporary fixation has been removed.

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Acute Abdominal Conditions in Children.—H. R. Litchfield and L. H. Dembo (*Archives of Pediatrics*, December, 1921) in an analysis of two hundred cases emphasize the fact that the clinical picture of acute abdominal conditions in children differs greatly from that in adults. It is, therefore, a mistake to look for characteristic clinical features, nor must one be misled by atypical syndromes. Appendicitis was found to be one of the most common of the acute abdominal affections in childhood. For purposes of differential diagnosis acute gastrointestinal disturbances, pneumonia with pleurisy, intussusception, and tuberculous peritonitis with acute symptoms have to be borne in mind.

Colic in Breast Fed Infants as a Result of Sensitization to Foods in the Mother's Dietary.—W. R. Shannon (*Archives of Pediatrics*, December, 1921) reports six cases bearing out the idea that colic may be caused in infants by the ingestion of foods to which the individual is sensitized. This conception has been made possible by the recent establishment of the fact that foods consumed by the mother may appear in the breast milk without metabolic modification. It is interesting to note that it was possible to demonstrate the presence of egg protein in the breast milk by anaphylactic experiment. Omission of eggs and, in some instances, of other offending foods, led to prompt disappearance of all symptoms.

This conception offers a satisfactory explanation of the fact pointed out by Czerny that breast milk is not always the best food for the baby. It also explains why one infant will thrive on breast milk that another cannot tolerate.

Gastric and Duodenal Ulcers.—Charles H. Mayo (*Annals of Surgery*, March, 1922) states that if it is true that there is an average duration of a number of years in the majority of cases of duodenal and gastric ulcers, many extending from twenty to thirty years, it is probable that there is an exaggerated idea of their danger to life. Acute perforation is a serious danger, which is greater when it occurs as a primary symptom of ulcer. Subacute and chronic perforations are frequently noted at operation. Extensive hemorrhage may also cause death. While few persons die from these conditions the number is greater than the number of those who succumb from surgical measures, which, if instituted in time, should restore the patient to health and activity. It is true that patients suffer, are disabled and should be relieved, and it is also probable that but a small percentage of the total number of ulcers are early recognized and treated for the true condition. Gastric ulcers may give greater discomfort than duodenal ulcers, and because of the danger of malignant degeneration should be destroyed at the time of the operation unless this procedure would add unwarranted immediate risk. I believe patients who have gastric ulcer should be informed of this danger. While blocking the pylorus has been recommended in addition to gastroenterostomy and practiced, the procedure was unnecessary and is now obsolete. In the surgical treatment of ulcer we have applied a well known principle of agriculture: an acid and continuously wet soil is tiledrained and its surface limed.

Gastroenterostomy.—H. Cohen (*Surgery, Gynecology and Obstetrics*, November, 1921) reports many cases and gives these conclusions: 1. These cases are fortunately rare. 2. The ligament of Trietz is a fixed point high up in the left hypochondrium and should be readily recognized in contradistinction to the ileum which is close to the cecum, the latter being easily recognizable. 3. Some of the food in my patient passed through the pylorus and small intestines thus allowing just enough nourishment to prevent the patient succumbing from starvation. 4. This patient's symptoms were diagnosed as neurasthenic for two years. 5. The same symptoms were present in all the cases reported, viz., obstinate constipation, burning sensation in epigastrium, loss in weight, and nausea.

Gastroenterostomy.—R. C. Webb (*Surgery, Gynecology and Obstetrics*, December, 1921) concludes that gastroenterostomy should not be performed without demonstration at the time of operation of the definite indication or lesion. Disconnecting gastrojejunal stomata should be preceded by most careful clinical and laboratory studies. From the three clinical cases cited it is seen that the closure of gastrointestinal anastomoses may be often indicated, and that it is a safe procedure. The results in the three clinical cases and the two animal experiments prove the value of the use of a cuff of stomach wall and the efficiency of the method to prevent constriction. The Andrews operation with the slight modifications suggested should become a standardized procedure as long as the indiscriminate use of gastroenterostomy, without indication, is continued.

Neoplasia in Gallbladder.—K. Renshaw (*Annals of Surgery*, December, 1921) asserts that malignancy of the gallbladder is not an uncommon occurrence. Carcinoma is the most common type of neoplasia found; sarcoma is exceedingly rare. Gallstones are complications in a large number of cases. Heredity seems to have little influence in the development of malignancy in this organ. Females and males are afflicted in the ratio of about four to one. Seventy-five per cent. of cases occur between the ages of fifty and seventy. In most cases there has been a history of gallstones for some time. Early cholecystectomy for stones will either prevent the development of malignancy or find the condition in its incipency. Late operation is of little value except as a diagnostic procedure.

Septic (Nonvenereal) Infections of Bladder and Kidney in General Practice.—Joshua Ferguson (*Glasgow Medical Journal*, January, 1922) says that early recognition of premonitory symptoms is most important, especially in children. Any departure from the normal conditions of intestinal action should be observed and dealt with. An unusual frequency of micturition and the development of an unusual odor in the urine are occasionally found to precede an attack of pyelitis. Children should be early trained in sound and cleanly functional habits. Lavage of the urinary channels is of prime importance; weak tea, barley water, alkaline table waters are all valuable. These should be followed by a diet rich in carbohydrates; extractives and other foods of high nitrogenous content should be excluded for months.

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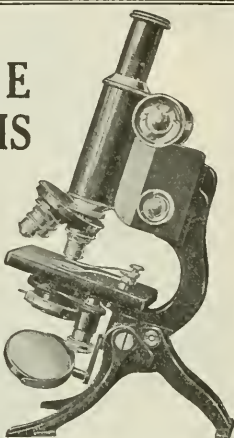
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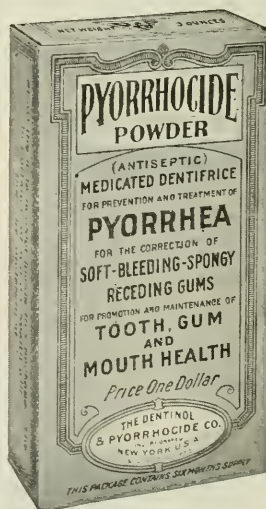
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Herewith is a photograph of Page 95, Vol. 11, "Diseases of Women," as edited by H. Marion-Sims, M. D., and in Dr. Sims' own words, is recorded the high esteem in which he held *Hayden's Viburnum Compound* and the "great service" rendered in treating

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DYSMENORRHEA.

95

It has been long known that rest is most efficacious in relieving dysmenorrhea. Some patients habitually go to bed during the menstrual process, finding so much relief from the position. There is nothing therefore new in the recommendation to rest at this time, but experience has shown that the positional treatment above described carries the effect still further. The treatment is particularly valuable in the case of young single women who are suffering from dysmenorrhea out of such severe character as to render internal treatment imperatively necessary. And indeed I have in several cases employed positional treatment with great success where no examination at all had been made, but where the symptoms and general history conclusively showed that the patients were suffering from commencing uterine flexion.

Positional treatment is also very valuable as an adjunct in cases where interal mechanical apparatus are in use.

Palliative Measures.—Rest, the horizontal position, postural treatment, as above described, are all of first-rate importance. The warm hip-bath, temperature too° or even higher, is to be recommended. Copious vaginal injections of hot water are sometimes found very serviceable. Ether, compound spirit of sulphuric ether, camphor, and heobane are ordinary and very useful remedies. Gin and water is a common domestic remedy. Fomentices with laudanum sprinkled over them, hypodermic injections of morphia, turpentine stupes, are other remedies occasionally employed. Suppositories containing opium or morphia are very effective, but the use of opium is not advisable unless under strict medical orders. Chloral and bromide of potassium are good remedies. Guaiacum (Dewees), black hellebore (Meigs), have been strongly recommended. Colchicum, cannabis indica, and in fact every sedative and anti-spasmodic in the pharmacopœia, have been employed for the relief of the pain with more or less success.

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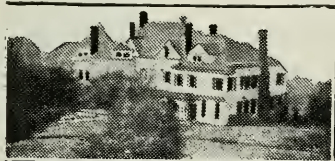
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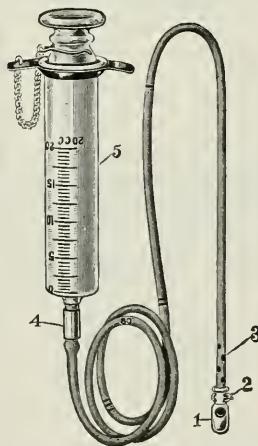
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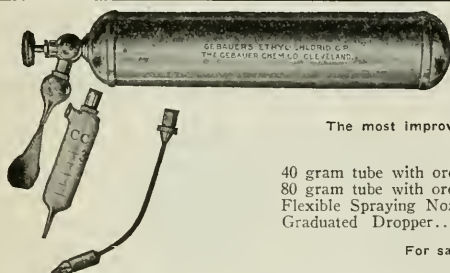
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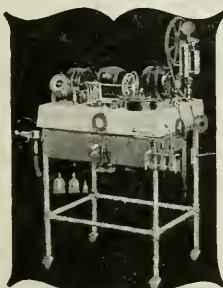
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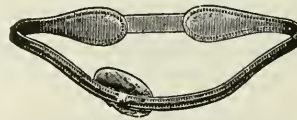


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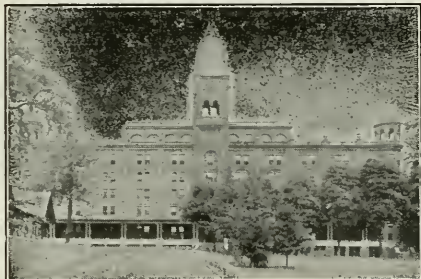
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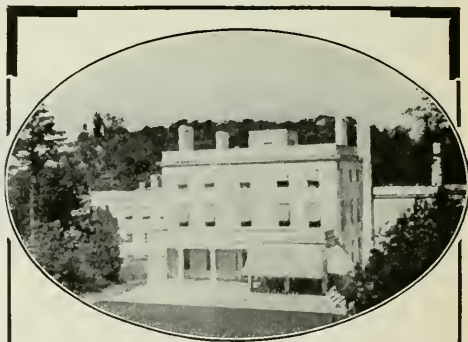
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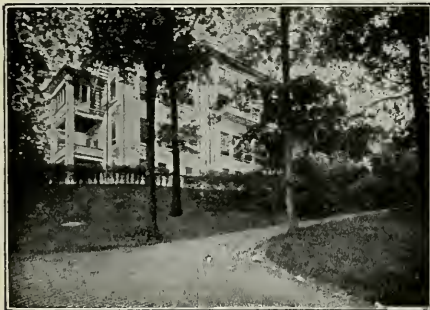
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INDEX TO ADVERTISERS

Abbott Laboratories, The	9
Alkalol Company	21
Allied Drug & Chemical Corporation	35
Angier Chemical Company	28
Aseptinol Manufacturing Company	40
Bard-Parker, Inc.	45
Becton, Dickinson & Company	30
Betz Company, Frank S.	27
Block Company, J. H.	50
Borden Company, The	33
Bovinine Company	21
Breitenbach Company, M. J.	23
Breon Company, George A.	38
Bristol-Myers Company	48
Burnham Soluble Iodine Company	46
Calco Chemical Company, The	16
Campho-Phenique Company	28
Carbic Color & Chemical Co., Inc.	43
Carnrick Company, G. W.	2
Castle Company, Wilmot	20
Classified Advertisements	58
Collene Laboratories, Inc., The	25
Comer, Fetterly & Co., Inc.	17
Dad Chemical Company	50
Davis & Geck, Inc.	18
Dentinol & Pyorrhoeide Co., Inc.	42
Denver Chemical Mfg. Co.	11
Diarsenol Company, The	18
Ditman, A. J.	50
Donovan, Cornelius	50
Dry Milk Company, The	60
Dry Products Company, The	17
Fairchild Bros. & Foster	6
Farwell & Rhines	50
Fellows Medical Mfg. Co., Inc.	12
Fleischmann Company	59
French Lick Springs Hotel Co.	39
Fuller Company, George R.	50
Gardner, R. W.	16
Gebauer Chemical Co.	49
Gourd, Henry E.	43
Grand Trunk Railway System	41
Great Bear Spring Water	48
Haas Pharmacy	46
Harris Laboratories	19
Heinichowicz, J.	47
Hoffmann-La Roche Chemical Works	5
Hygeia Nursing Bottle Co., The	60
Katharmon Chemical Company	6
Kirbach, Dr. H.	24
Kny-Scheerer Corp'n of America, The	47
Kookokey Co., Inc., S. M.	48
Lambert Pharmacal Company	20
Leeming & Company, Thomas	25
Lilly & Company, Eli	15
Lister Bros., Inc.	44
Marks, A. A.	42
Marvel Company	40
McIntosh Electrical Corporation	49
McKesson & Robbins	24
Mellier Drug Company	47
Mellins Food Company	26
Merck & Company	45
Merrell Company, Wm. S.	38
Metz Laboratories, Inc., H. A.	26
Munson, Miss D.	22
National Bio-Chemical Laboratory	45
National Pathological Laboratories	46
Nestles Food Company	39
New York Intravenous Laboratory	8

New York Pharmaceutical Co.	44
Nuforal Laboratories, Inc.	27
Oakland Chemical Company	4
Od Chemical Company	47
O'Sullivan Rubber Company, Inc.	25
Packer Mfg. Company	37
Pandiculator Company	22
Parke, Davis & Company	29
Peacock Chemical Company	49
Peerless Truss Company	48
Platt Company, Henry B.	43
Plessner Company, Paul	40
Pomeroy Company	46
Precision Thermometer & Instrument Co.	48
Pond's Extract Company	50
Purdue Frederick Company	31
Rieker Instrument Company	48
Sanitube Company	13
Schering & Glatz, Inc.	7
Schieffelin Company	33
Sharp & Dohme	23
Sherman, Dr. G. H.	35
Smith, Kline & French Company	36
Smith Company, Martin H.	43
Snow, Thomas B.	40
Spencer Lens Company	42
Stoeger, A. F.	14
Storm, Dr. Katherine L.	42
Sultan Drug Company	45
Thorek, Dr. Max	48
Wallau & Company, George	49
Wampole & Company, Henry K.	19
Wilmot Castle Company	20
Winthrop Chemical Company, Inc.	37
Wood & Company, William	10

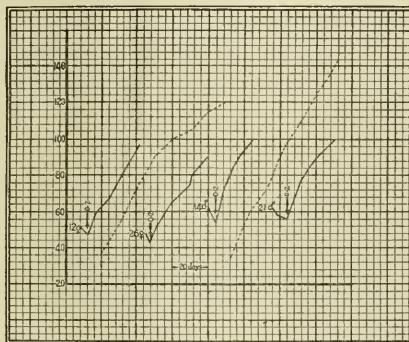
INSTITUTIONS AND SANITARIUMS

Barnes	53
Battle Creek	36
Brook's House	51
Brook's Sanitarium	51
Belle Mead	54
Byram Lake Farm	51
Carlton	52
Clifton Springs	54
Crest View	56
Elm Hill	51
Engle Nook	52
Fair Oaks	55
Givens	53
Glen Springs	41
Idylease	53
Interpines	56
Jefferson Medical College	56
Kellogg's House	51
Lloyd Dr.	56
Madden, Dr. J. T.	51
McFarland, Dr. D. W.	51
Packer, Dr. F.	54
Pearson, Dr. C. W.	51
Petty & Wallace	54
Ring, Dr. A. H.	51
River Crest	56
Riverdale	54
Sanford Hall	54
Spring Hill	55
Waukesha	55
Woodlawn Maternity Home	51

A comparison of Fleischmann's Yeast with the laboratory standard as concerns vitamin content

"As efficient as our very active laboratory yeast," said the scientist after the careful tests were completed.

The dotted lines show the normal growth rate of albino rats. The heavy lines show the growth rate of the rats when fed Fleischmann's Yeast.



SOME valuable vitamin studies have been recently made with Fleischmann's Yeast. The albino rat was the experimental animal used in a series of tests carried on over a period of three and a half months.

Altogether 99 rats, young and sleek, of from 60 to 80 grams, were used. They were given a standard diet from which only the vitamin-B was lacking. After a certain decline in weight due to lack of vitamin-B, Fleischmann's Yeast was added to their diet. The yeast was fed moist but on a dry weight basis. The rats always ate the yeast greedily. Their subsequent growth rate indicated the value of this yeast as a source of B-vitamin.

The chart with its caption tells the story.

Fleischmann's Yeast is a pure food

product, containing no drugs of any kind. It is a proven rich source of vitamin-B. Try it out on your own cases where vitamin-B is indicated. It may be eaten plain, suspended in water, milk or fruit-juices, or spread on crackers. The physician will regulate the amount of dosage which will probably vary with the individual needs. From one to three cakes a day has usually been found satisfactory.

Fresh yeast has therapeutic value entirely aside from its vitamin content. For full data on this interesting study, send for the recently published brochure on the manufacture, chemistry, physiology and therapy of yeast. This book is distributed free to physiological chemists, physicians and hospitals. Address THE FLEISCHMANN COMPANY, Dept. E-6, 701 Washington Street, New York City.



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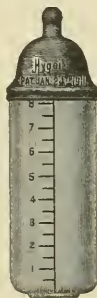
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